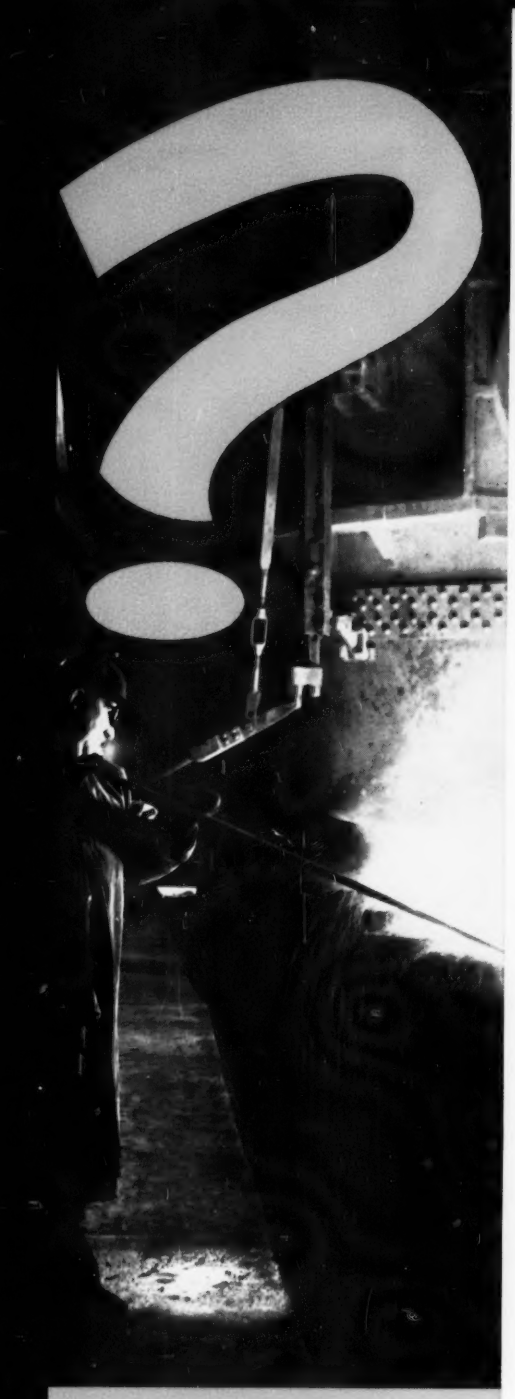

NOVEMBER 30, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Will It Take Congressional Action To Settle the Steel Strike?

Standardization Payoff: $6 for $1

Airport Ground Support Equipment: Jet Age Promises Market Growth

Coolant Clarifier Improves Finish

New Grinding-Gaging Setup Permits 0.000020 in. Jet Part Tolerances

Now You Can Bond Cast Iron To Aluminum Without Fluxes

130 Million Tons of Ingot Production in 1960?

That would be an all-time record, well above previous peak of 117 million tons in '55. The pace is definitely possible—barring a new walkout by steelworkers in January. Inventory building and record durable goods sales will provide the demand to keep mills operating at brisk rate—Page 57

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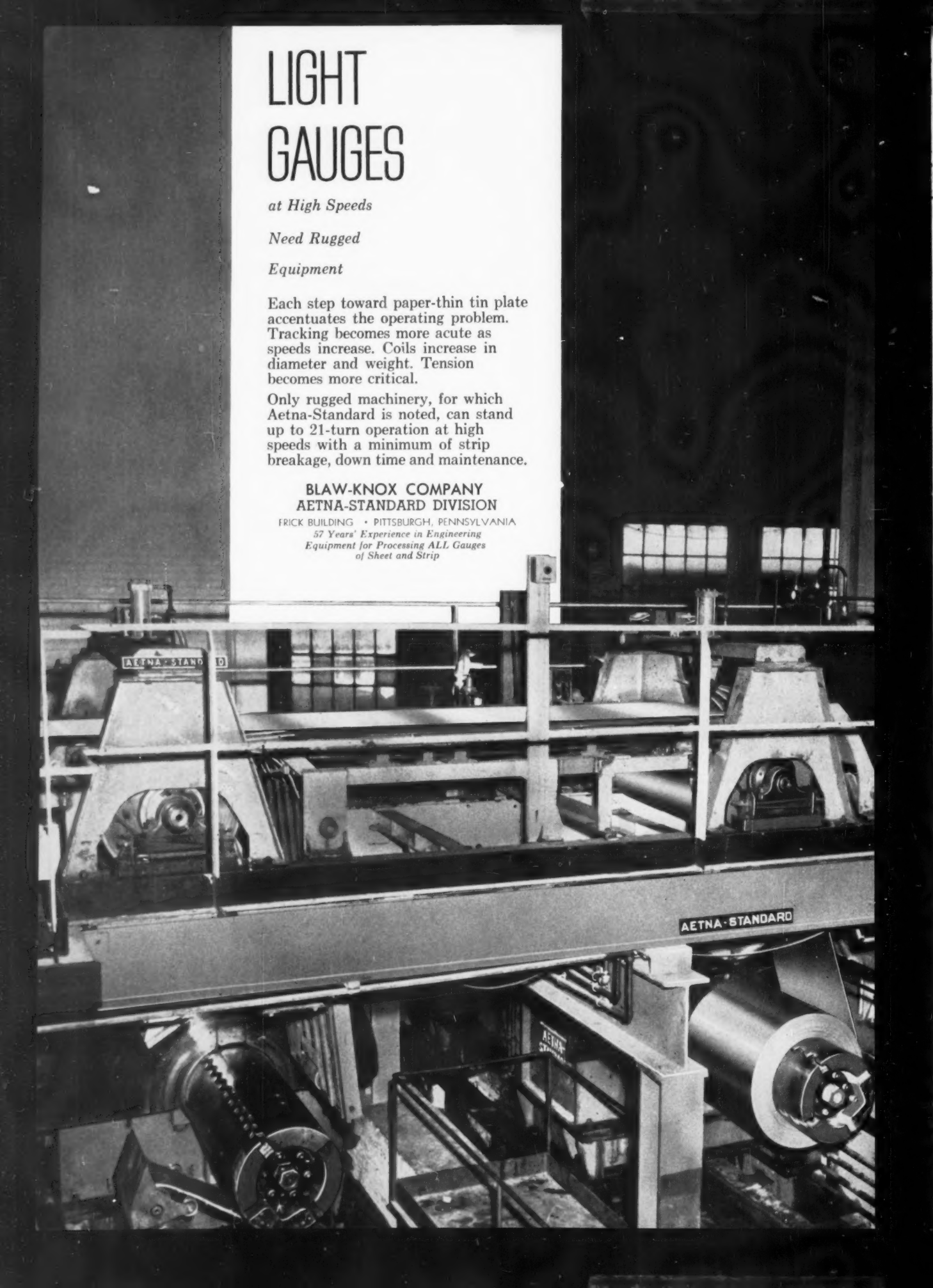

LIGHT GAUGES

at High Speeds

Need Rugged

Equipment

Each step toward paper-thin tin plate accentuates the operating problem. Tracking becomes more acute as speeds increase. Coils increase in diameter and weight. Tension becomes more critical.

Only rugged machinery, for which Aetna-Standard is noted, can stand up to 21-turn operation at high speeds with a minimum of strip breakage, down time and maintenance.

BLAW-KNOX COMPANY
AETNA-STANDARD DIVISION

FRICK BUILDING • PITTSBURGH, PENNSYLVANIA

57 Years' Experience in Engineering Equipment for Processing ALL Gauges of Sheet and Strip

This Week in STEEL

The Metalworking Weekly

November 30, 1959 Vol. 145—No. 22

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Index available semiannually.

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED NOV. 21	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	157†	134	116	154

†Preliminary.

Paced by the steel industry, STEEL's industrial production index trend line rose above the 1958 line during the week ended Nov. 21 for the first time since the week before the strike began. But cutbacks in metalworking caused by still dwindling steel supplies will hold a general uptrend in check.

Details on Page 79

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED NOV. 28	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled	65,000*	67,687†	101,616	123,008

(Source: Ward's Automotive Reports.) *Estimated. †Preliminary.

Auto producers are trying to hold to present assembly levels until badly needed steel begins to arrive in quantity. General Motors is still closed down, but Ford and Chrysler may avoid further major slowdowns.

Details on Page 76

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED NOV. 29	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	2,492*	2,233	371	1,988
Index (1947-49=100)	155.1*	139.0	23.1	123.8
Percentage of capacity	88.0*	78.9	13.1	73.1

*Estimated by STEEL; comparative figures reported by AISI.

Breakthrough into the 90 per cent plus range is confidently expected this week. Mills have lifted production to the highest level since the week ended June 21 when 2,620,000 tons were recorded.

Details on Page 148

STEEL SCRAP PRICE COMPOSITE

	NOV. 25	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh	$43.67	$44.83	$44.33	$40.33

Relatively small purchases of scrap have been negotiated at levels below those recently quoted. However, these establish the market in the absence of large tonnage transactions. Brokers continue to look for moderate advances.

Details on Page 161

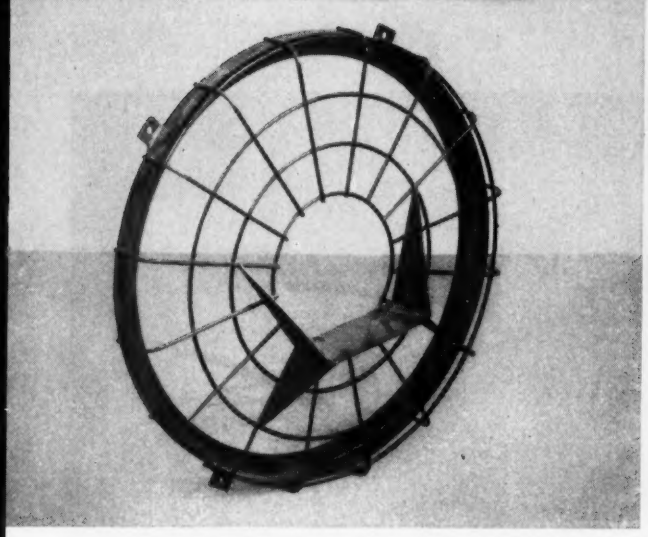
FINISHED STEEL PRICE INDEX

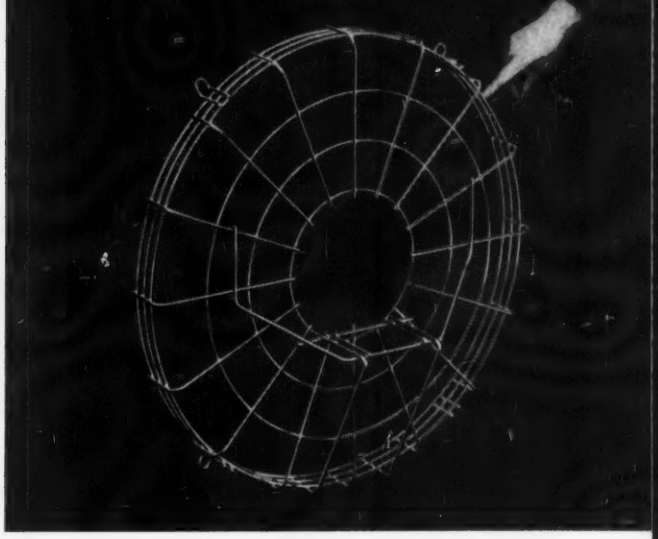
	NOV. 24	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.8†	186.8	186.8	186.9

†Preliminary.

Many market authorities believe that foreign mills will have to reduce their prices here soon or lose business to the domestic producers. Most imported items range as much as $14 a ton under U. S. mill quotations.

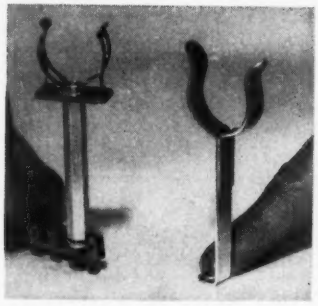
Details on Page 149





MOTOR MOUNT AND GUARD for a transformer cooling fan. The all-wire piece, right, reduced cost to one third of former price, and weight from 24 lb to 13½ lb. The ¼-in. and 5/16-in. welded steel wire design, replacing the strip, wire frame, and cast rim assembly, also allowed closer tolerances.

How redesigning with steel wire



BRACKET to hold two-way radio plugs on chassis. Cost reduction was 75 pct and weight savings 50 pct when the complicated six-part assembly was eliminated. Manufacturing time of this simple, two-part, ⅜-in. x 1/16-in., flat steel wire design, right, was considerably reduced.

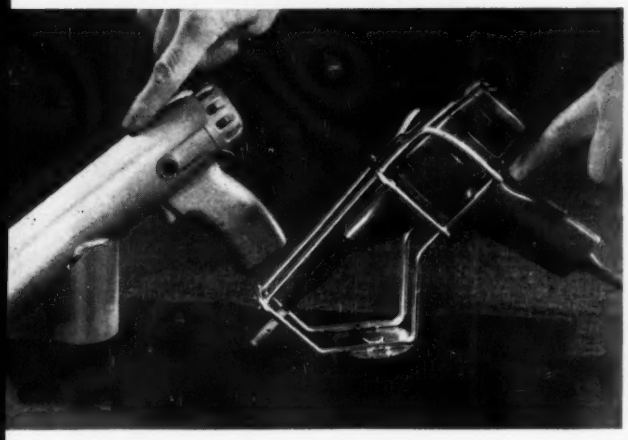
. . . cuts costs

. . . adds strength

. . . saves time

. . . reduces weight

HOLSTER for electric tool. The open wire frame reduced weight by 10 pct and cost by 66 pct. Replacing the welded tubing part, left, this steel wire assembly lends versatility in that it fits several types of tools.



These four examples show clearly why engineers and designers so frequently turn to steel wire for lower costs, simpler designs, and faster production.

Bethlehem makes wire for literally thousands of uses: upholstery spring wire, wire for cold-heading, wire for welded products, wire for handles, communications wire, etc. We regularly produce many grades of steel wire, with various coatings, processed in many ways to meet specific application requirements. Whether you need an ordinary or a special-purpose grade—our modern wire mills can produce it.

Our wire experts are at your service. A letter or call to your nearest Bethlehem sales office is all that's necessary.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

These case histories were furnished through the courtesy of E. H. Titchener and Co., Binghamton, N. Y., a regular user of Bethlehem wire.

BETHLEHEM STEEL

BETHLEHEM STEEL

NEW Customer Service from MORSE—

Double-Pitch Sprockets and Chain Combination "Right off the Shelf!"

If your equipment design calls for low-speed transmission up to 500 rpm, here's the good news of on-the-spot delivery.

Morse precision, double-pitch stock sprockets, coupled with Morse double-pitch chain make a perfect combination . . . ready for immediate delivery . . . with no special machining time needed. These Morse components, right off the shelf, provide lighter, smoother, more compact power transmission. Their low cost, from big-volume stock production, is also an important factor.

Morse Taper-lock® double-pitch sprockets with odd number tooth design of 17, 19, 21, 23, 25, or 35 cut teeth give double service life, since each tooth engages the chain only every other revolution.

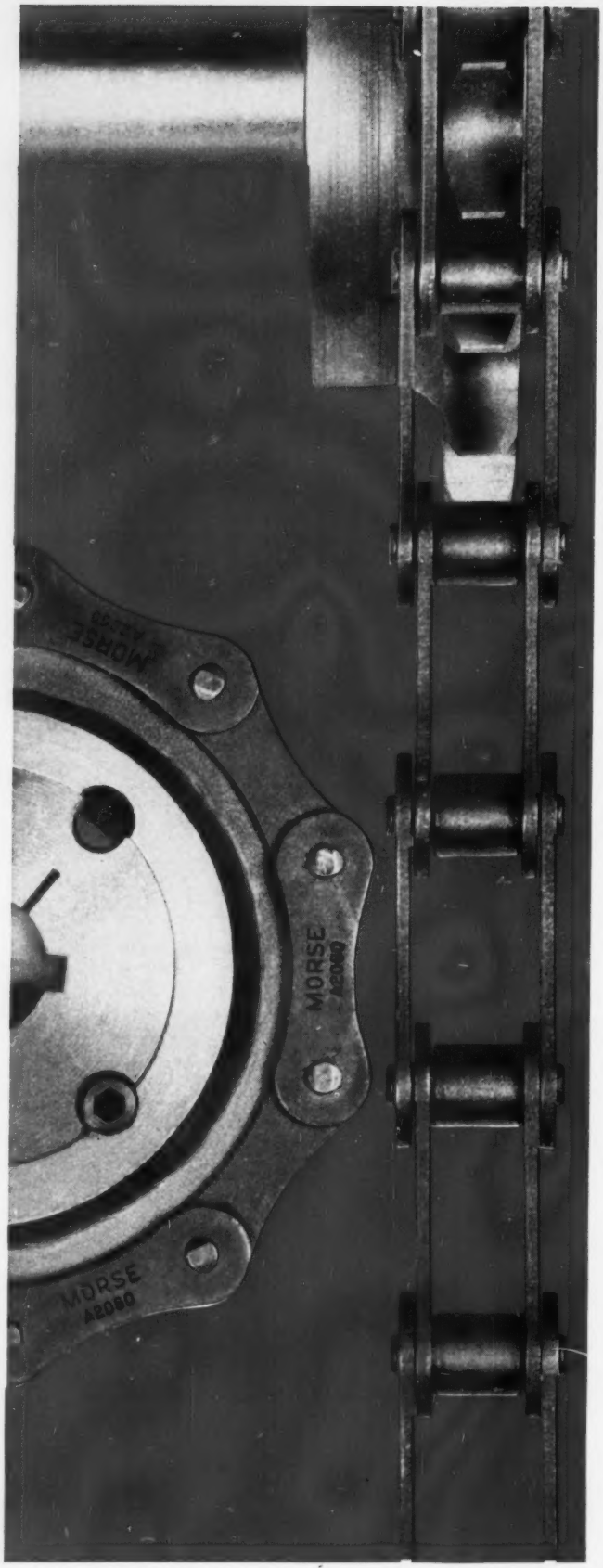
Morse double-pitch roller chain is precision made to A.S.A. standards. Packed in convenient 10-ft. lengths, Morse double-pitch chain comes in 1″ to 2″ pitch for power transmission and in 1″ to 2½″ pitch for conveyor service.

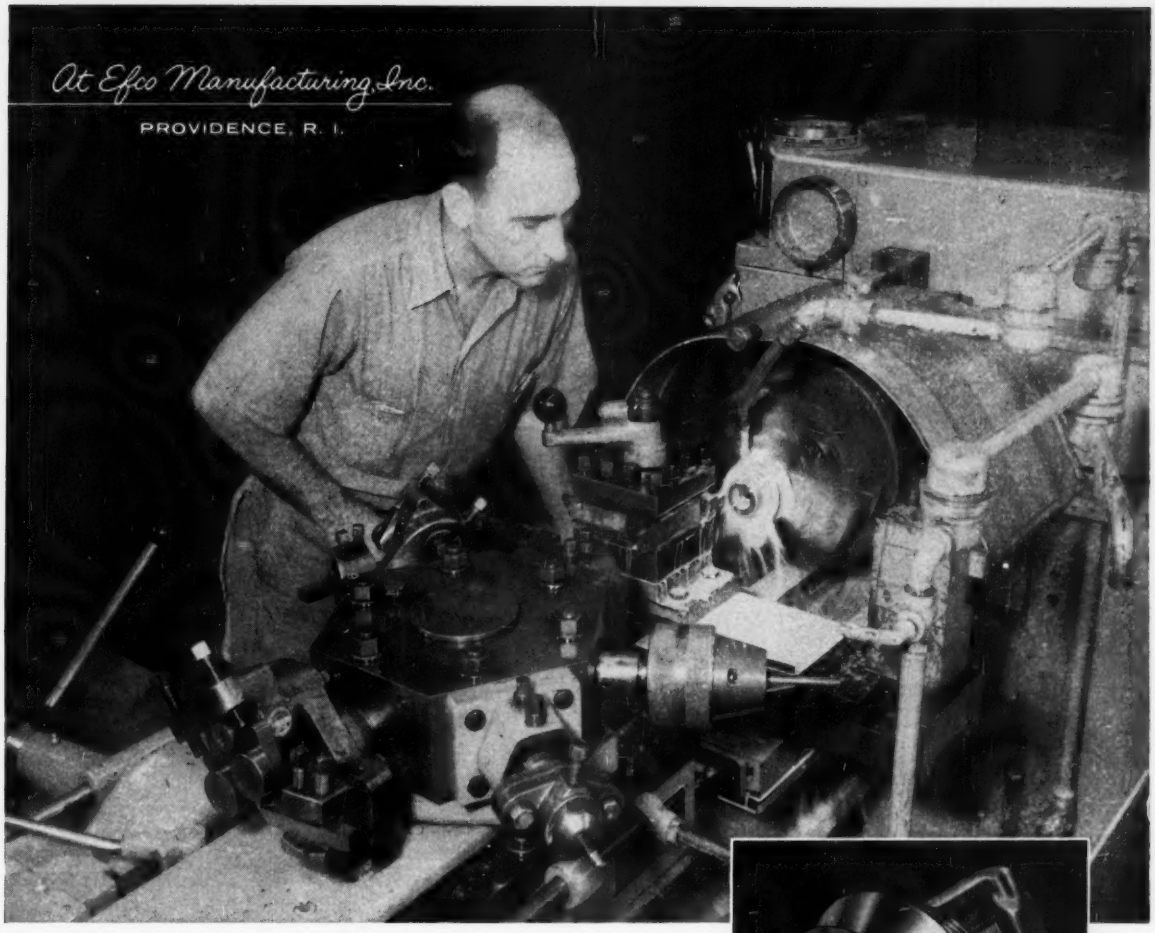
So, if your chain problem is packaging, farm machinery, conveyor, power transmission, or timing drives you'll find your answer waiting at your Morse distributor—he's listed in the Yellow Pages under "Power Transmission" or write: Morse Chain Company, Dept 2-119, Ithaca, N. Y. Export Sales: Borg-Warner International, Chicago 3, Illinois. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ontario.

MORSE *Trademark

* A BORG-WARNER INDUSTRY

ONLY MORSE OFFERS ALL FOUR: Roller Chain, Silent Chain, Hy-Vo® Drives and "Timing"® Belts.





Machining time cut 12 minutes per piece on these costly Monel Valve Bonnets

Another example of the cost-saving possibilities of modern Warner & Swasey turning equipment

Efco Manufacturing specializes in complex jobbing work requiring close tolerances and fine finishes in the more-difficult-to-machine materials, such as Haynes alloys, Monel and 300 and 400 series stainless steels.

A case in point is this bonnet for a 2-inch capped globe valve for the Navy's nuclear submarines. When transferred to a new Warner & Swasey No. 5 Ram Type Turret Lathe, machining time—involving many complicated forming cuts—was reduced from 40 to 28 minutes per piece. Required tolerances of .001 and surface finishes of 32 micro-inches were easily held because of the new machine's rigidity, accuracy and vibration-free performance. In addition, Efco is furnished *only* 30 forgings for a 30 piece run—and each is worth $80. There is no provision made for scrap loss!

Why not take a page from the Efco story and have your Warner & Swasey Field Engineer give you all the cost-cutting facts on these versatile No. 5 Turret Lathes. You'll be glad you did.

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

Cleveland Speed Variator accurately controls paper web fed into Schriber Printing Press

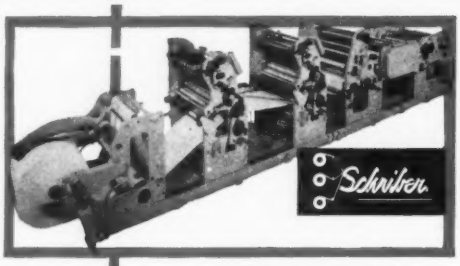
This new Rotary Offset Business Forms Press built by Schriber Press Company of Dayton, Ohio, was designed to provide printers with more hourly impressions—more daily output.

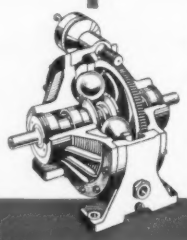
Its new infeed web tension control drive gives absolute constant tension from mill roll through a Cleveland Speed Variator-driven metering cylinder to press.

The Variator compensates for paper thickness—maintains constant surface speed of paper to the press—guarantees finished printing will always stay "in register".

A modified Cleveland Speed Variator providing increased precision within a limited (± 25%) range was selected for this important function. This was accomplished by changing the curve of Variator's iris plate. Thus, this Variator allows exacting adjustment for paper machine tension—holds that tension or can easily be changed to another speed setting.

If your operations demand speed variation, be sure to get the complete "Cleveland Speed Variator Story". It's all in free Bulletin K-200 —write for your personal copy today.





HOW IT WORKS

Power is transmitted from input shaft to output shaft through alloy steel driving balls which are in pressure contact with discs attached to the two shafts. Relative speeds of the shafts are adjusted by changing the positioning of the axles on which the balls rotate (see cutaway view, left).

CLEVELAND SPEED VARIATOR

The Cleveland Worm and Gear Company
Speed Variator Division
3270 East 80th Street, Cleveland 4, Ohio

A subsidiary of
Eaton Manufacturing Company

Sales Representatives in all major industrial markets
In Canada—Peacock Brothers Limited

STEEL
Servicenter

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

November 30, 1959

Alert Your Export Dept.

Within the next few weeks you'll be surveying foreign metalworking markets, courtesy of STEEL's editors. Government agencies, embassies, consuls, trade associations, and chambers of commerce are on the beats of our editors and foreign correspondents.

Our photographer caught New York Editor Ben Price (right) talking with Gen. Emilio Mau-

rell (front center), Brazilian delegate to the United Nations. Ben's interview notes, and those of many other editors, will be added to Derry Eynon's roundup article on South America. It's due next week.

Derry's also working up our annual survey of Western Europe; Brian Wilson (New York) is covering Russia and its European satellites. Jack Botzum (Washington) is doing one on Asia.

The Cosmic Four

In one of his interviews, Derry talked with Dr. Ricardo Gori-Montanelli, director, Italian Embassy Foreign Investment Office. "The European Common Market (the Inner Six) has countries trying to join it and others fighting it," said the doctor. Tongue in cheek, he foresees similar economic affiliations, among them: The Cosmic Four: Andorra, Liechtenstein, Monaco, and San Marino.

Ablation Materials Re-Enter

Robert W. Pollock, chief of technical liaison, Cincinnati Testing Laboratories Div., Studebaker-Packard Corp., Cincinnati, adds to our data on "Ablation: Today's Answer to Re-entry Heating Problems" (STEEL, Oct. 26, p. 106).

"In addition to supplying NASA with a unit similar to that supplied by General Electric, we are also under contract to supply the thermal shields for McDonnell Aircraft's prime contract for Project Mercury. Though 'the exact nature of the phenolic glass material is secret,' I can say the resin system employed in all ablation shields . . . is also a CTL development, the result of our polymer research."

This Man Draws the Line . . .

. . . for Chrysler Corp. He's Virgil M. Exner, Chrysler vice president and director of styling. Five runners - up in STEEL's 1960 Beat-the-Experts contest will collect full color prints of a dream car conceived by him expressly for the contest. The car is a beauty, an extension of the wedge or dart shape that brought Mr. Exner the gold medal award from the Industrial Designers' Institute for distinctive styling of the Chrysler line in 1957.

Mr. Exner comments on materials in the car of the future: "Lightweight metals will gain because they lend themselves to unusual finishes which stylists like. Heavier metals (zinc and chrome) are making advances and will be used more; these suppliers are doing things now which they should have done before. Plastics offer great advantages to stylists; some are used in the wrong places, but that'll be worked out. Aluminum became so popular so fast that it was used in wrong places; look for more use in future cars. Magnesium is uncertain; cost is one of its biggest drawbacks. Glass is more expensive than steel, but we'll continue to use more of it, despite the difference in cost."

His styling views—well, let's hold them until you see the dream car.

The best guesser in STEEL's contest will win two weeks behind the wheel of any one of the

I believe _____ automobiles will be produced in the U. S. from Jan. 1 through June 30, 1960.

Mail this to:
Ed Service
Beat-the-Experts
STEEL
Penton Bldg.
Cleveland 13,
Ohio

PRINT NAME _____
POSITION _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____

"Samson" Shot
(chilled iron)
"Angular" Grit
ANGULAR GRIT
AMERICA'S LEADING METAL ABRASIVES
The four most famous names in metal abrasives provide a size and type of shot or grit to meet every blast-cleaning need. Write for literature and recommendations.
PITTSBURGH CRUSHED STEEL CO.
Arsenal Sta., Pittsburgh 1, Pa.
MALLEABRASIVE
MALLEABLIZED SHOT and GRIT
SSP
TRU-STEEL SHOT
TRU-STEEL
HIGH CARBON STEEL SHOT

man conquers mountains

And, some day, man will also conquer cancer. With your help.

Guard your family . . . fight cancer with a checkup and a check

AMERICAN CANCER SOCIETY

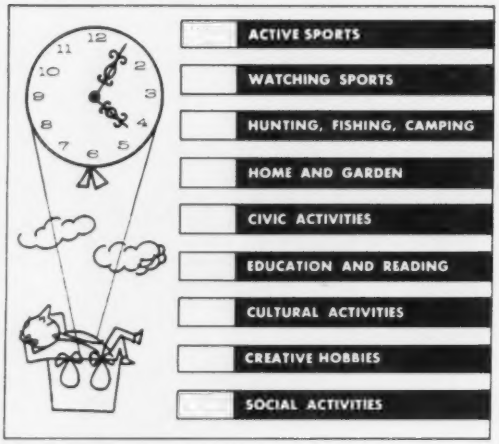
1960 Fords, from Falcon through the Thunderbird.

It's easy to enter. Just pick a number, write it on the coupon in this department. Get your entry here, postmarked by midnight, Dec. 31, 1959.

You can find the full rules in the Nov. 16 Servicenter, p. 5.

What's Your Leisure Time Index?

(RATE ORDER OF PREFERENCE)



A survey by the *Harvard Business Review* and the Twentieth Century Fund shows how some 15,000 business executives would use additional leisure (if they had it):

Education and reading were placed first by 82 per cent of the executives; 75 per cent picked active sports; 72 per cent, home and garden; 68 per cent, hunting, fishing, and camping; 65 per cent, social activities; 59 per cent, civic activities; 58 per cent, cultural activities; 45 per cent, watching sports; and 38 per cent, creative hobbies.

How did you do?

Getting Ahead of Ourselves

The first batch of copy for STEEL's 1960 Metalworking Yearbook and Planning Guide has gone through the Linotype room. Why so far ahead of the Jan. 4 publication date? Well, yearbooks are printed while the Press Div. runs its regular complement of Penton magazines: STEEL, *Foundry, Machine Design, Automation,* and *New Equipment Digest.* It's a kind of "with one hand we juggle five books and with the other publish a sixth" situation. Sounds casual, but it takes a lot of followthrough on the planning that started months ago for the 400 plus pages.

We'll give you more inside information in subsequent columns.

Productioneered Equipment Improves Pickle Line Output

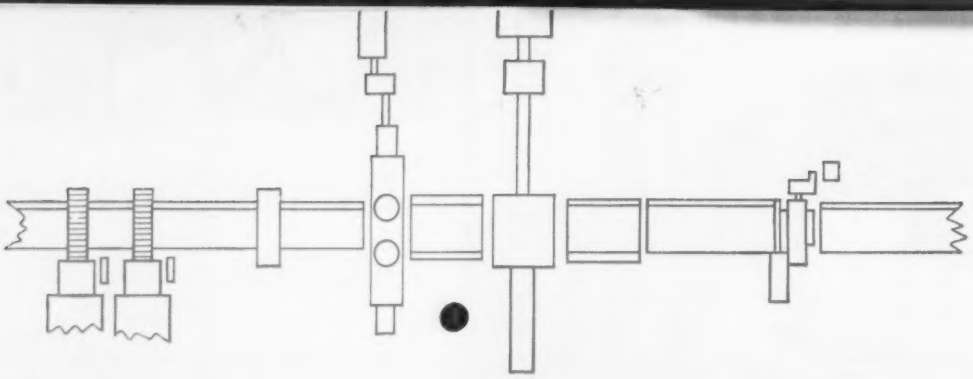
Seven new features developed by Production Machinery engineers and designers are incorporated in this PM Stainless Steel Intermediate Pickling and Annealing Line now in service at Universal Cyclops' Coshocton mill. These developments fit the specific requirement of Universal Cyclops, and result in more profitable operation. Creativity in designing and building equipment to fit the user's needs is the secret of PM "productioneering." We'll be glad to discuss with you the advantages you can get from "productioneered" lines — advantages which generally come as better production, more profits.

Production Machinery Corporation

Mentor, Ohio

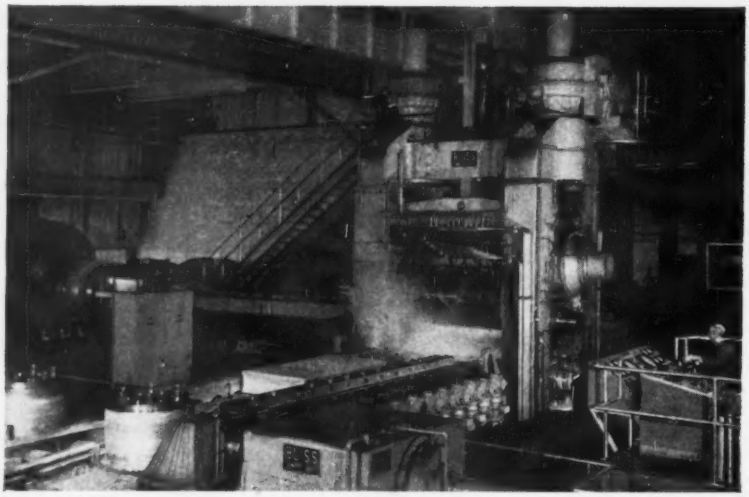
Designers and Builders of Metal Processing Lines and Equipment including: lines for pickling, slitting, shearing and cutting-to-length, grinding, scouring, coil build-up, inspection, and other sheet and strip processing lines and machinery.

PM®



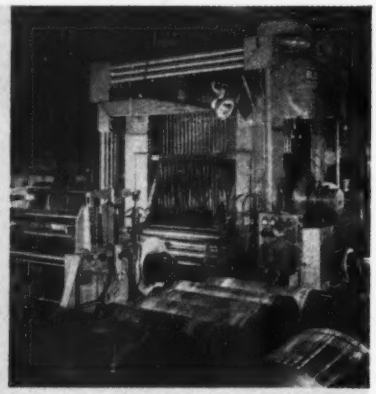
At Olin Mathieson's new aluminum rolling plant...

all reductions—HOT and COLD—are done on Bliss mills

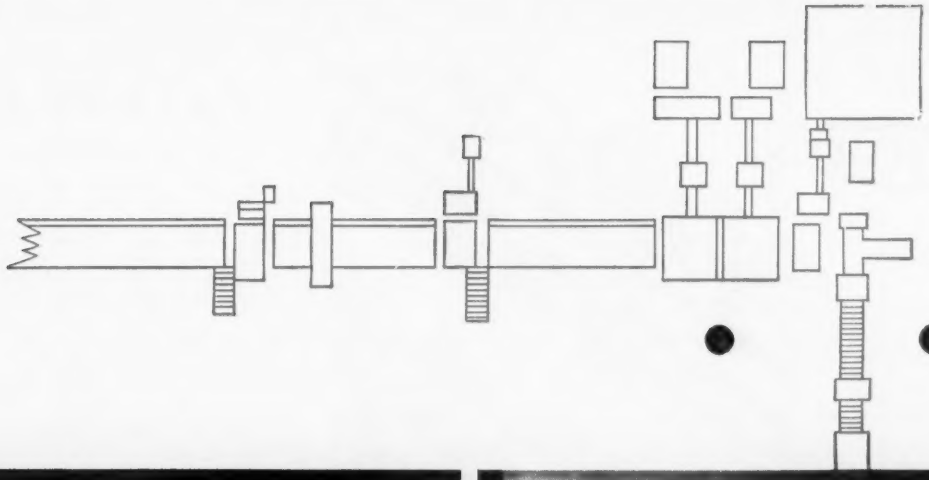


● Five-ton, 16- and 20-inch thick aluminum ingots are broken down to ½-inch thickness in a series of passes between the work rolls of this Bliss 4-high reversing hot mill. Vertical edging rolls can be seen at the far left.

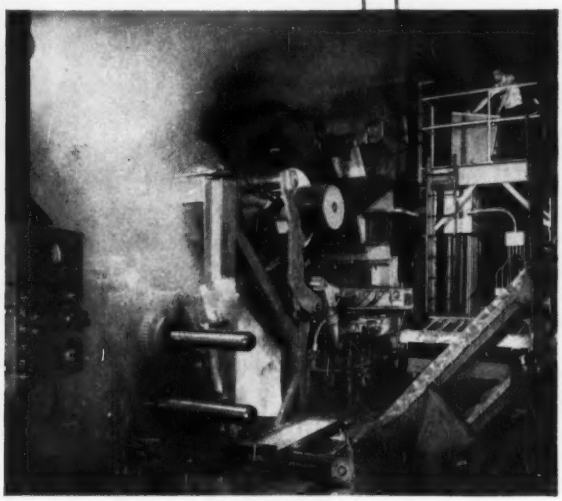
Four-high two-stand tandem cold mill reduces 10,000-pound coils of hot rolled strip to gages as fine as .010" at speeds in excess of 1200 feet per minute. Coil handling equipment on this mill includes both coil box for feeding heavier gage material and mandrel-type payoff reel for lighter gages. Delivered strip is taken up on a tension reel with horizontal belt wrapper.



Gages as fine as .006" can be rolled on this four-high cold finishing mill, the last reduction mill in the line at the Omal plant. Mack-Hemp rolls play an important part in several of these mills.



● Single pass through this hot finishing train reduces the plate delivered by the reversing mill to hot rolled strip. Coming from the last mill stand, the strip's edges are trimmed and...



● ...it is taken up on this hot mandrel coiler and horizontal belt wrapper. These auxiliaries wind it into neat coils for further processing.

At the brand new Omal, Ohio, plant of Olin Mathieson Chemical Corporation, every step of rolling 10,000-pound aluminum ingots down to .006" strip is done on Bliss equipment. Rated capacity of the mill is 10,000,000 pounds of finished rolled aluminum products every month, a figure already surpassed.

Besides the various mills, Bliss built and installed all the tables and other auxiliary equipment required for the complete strip rolling operation.

The part played by this rolling mill equipment in the new Omal plant's production facilities is testimony to Bliss' long record of successful installations in the aluminum industry. For information on other representative Bliss rolling equipment and auxiliaries in both ferrous and non-ferrous plants, write today for our 84-page Rolling Mill Brochure, Bulletin 40-B.

BLISS
SINCE 1857 ®

Bliss is more than a name
...it's a guarantee

E. W. BLISS COMPANY
Rolling Mill Division • Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio

OSBORN

BEFORE BRUSHING
Close-up of leaded steel cog roller shows burrs... heat-treat scale... sharp edges. Off-hand finishing time: **2 minutes.**

AFTER BRUSHING
Burrs and scale completely removed...all edges and grooves uniformly blended. Osborn 3-A Finishing Machine cycle time—including handling time: **40 seconds.**

Phone parts finished at 90-an-hour clip

...superior quality 3 times faster with OSBORN Power Brushing

TELEPHONE SWITCH PARTS are automatically finished to exacting specifications. This efficient Osborn 3-A Metal Finishing Machine—using Osborn Monitor® Brushes—deburrs and finishes lots of 2000 to 4000 parts *better and 3 times faster* than former method.

These are cog rollers—vital parts of telephone switches made by a leading manufacturer of electronic and communications equipment. Properly finishing these components means thorough deburring plus removal of heat-treat scale and sharp edges.

Hand scraping and off-hand methods were slow—took 2 minutes per part—rejection rate was high and costly.

Today, an Osborn 3-A Metal Finishing Machine does the job 3 times as fast—just 40 seconds per part including handling time—and saves 2000 hours a year on this one part alone. *Plus values:* high, uniform quality . . . rejects eliminated.

This Osborn finishing application is typical of how *you* can pinpoint savings, too. An **O**sborn **B**rushing **A**nalysis—made in your plant now at no cost or obligation—is the first step. Write us for full details. *The Osborn Manufacturing Company, Dept. S-15, Cleveland 14, Ohio.*

Osborn Brushes

METAL FINISHING MACHINES . . . AND FINISHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY

CALENDAR
OF MEETINGS

Nov. 30-Dec. 4, Exposition of Chemical Industries: Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Dec. 2, Electric Overhead Crane Institute Inc.: Annual meeting, Carlton House, Pittsburgh, Pa. Institute's address: 1 Thomas Circle, Washington 5, D. C. Executive secretary: Joe H. Peritz.

Dec. 2-4, Metallurgical Society of AIME: Electric furnace steel conference, Sheraton-Cleveland Hotel, Cleveland. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

Dec. 2-4, National Association of Manufacturers: Congress of American Industry, Waldorf-Astoria Hotel, New York. Association's address: 2 E. 48th St., New York 17, N. Y. Executive vice president: Charles R. Sligh Jr.

Dec. 4-6, National Federation of Independent Scrap Yard Dealers Inc.: Convention, Plaza Hotel, New York. Federation's address: 29 Broadway, New York 6, N. Y. Counsel: Morris Rosoff.

Dec. 6-9, Drop Forging Association: Winter meeting, Savoy-Hilton Hotel, New York. Association's address: Public Square Bldg., Cleveland 13, Ohio. Executive vice president: Dwight M. Allgood.

Dec. 6-10, American Institute of Chemical Engineers: Annual meeting, Sheraton-Palace Hotel, San Francisco, Calif. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Van Antwerpen.

Dec. 15, Material Handling Institute Inc: Annual meeting, Savoy-Hilton Hotel, New York. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

1960

Jan. 6-8, American Management Association: Special packaging conference, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y.

Jan. 15, Malleable Founders' Society: Semiannual meeting, Sheraton-Cleveland Hotel, Cleveland. Society's address: 781 Union Commerce Bldg., Cleveland 14, Ohio.

Jan. 21-22, National Industrial Conference Board Inc.: General session for all associates, Hotel Commodore, New York. Board's address: 460 Park Ave., New York 22, N. Y.

Ingot Mold Cars . . .

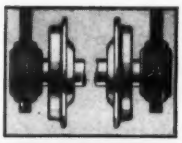
built to last by a company that uses them!

5 unique structural features make them better

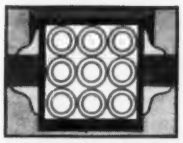
Ingot Mold Cars take more punishment than perhaps any other cars in a modern steel plant. In the 36 years we have been making these cars for our own use, United States Steel has developed a number of features in structural design that assure longer life, less maintenance, and dependable service.

Shown here is a typical 8-wheel, 200-ton capacity Ingot Mold Car. The advantages illustrated at the right—plus the rugged durability of all-welded rolled-steel construction—make any size USS Ingot Mold Car a profitable investment.

Our representative will be pleased to call at your convenience to discuss your requirements for this or any other type of industrial car. For more information, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. *USS is a registered trademark*

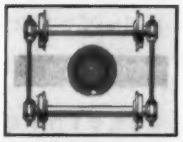


Anti-friction outboard bearings: High-capacity anti-friction bearings are located *outside* each of the car's eight wheels to minimize sideway and to provide long, smooth-running performance.



Seventy-two coil springs: Nine coil springs between each two wheels on both sides of the car—plus nine overload coils *inside* these—provide a total of 72 separate springs for a shock-absorbed *level* ride, so important in hauling molten metal.

High engineering safety factor: Designed for a 200-ton normal capacity load—including ingots, molds and stools—each car has a substantial built-in safety factor to withstand maximum ingot-stripping thrusts.



Oversize center plates: "Beefed-up" center plates between the trucks and car body are 18 inches in diameter—compared with the conventional 12 inches—to reduce the load per square inch on their surfaces.

Hot-metal shields: Curved end plates, long side skirts, and special drip shields protect the couplers, bearings and springs from runover molten metal and troublesome solidified drippings.

USS

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Tennessee Coal & Iron — Fairfield, Alabama
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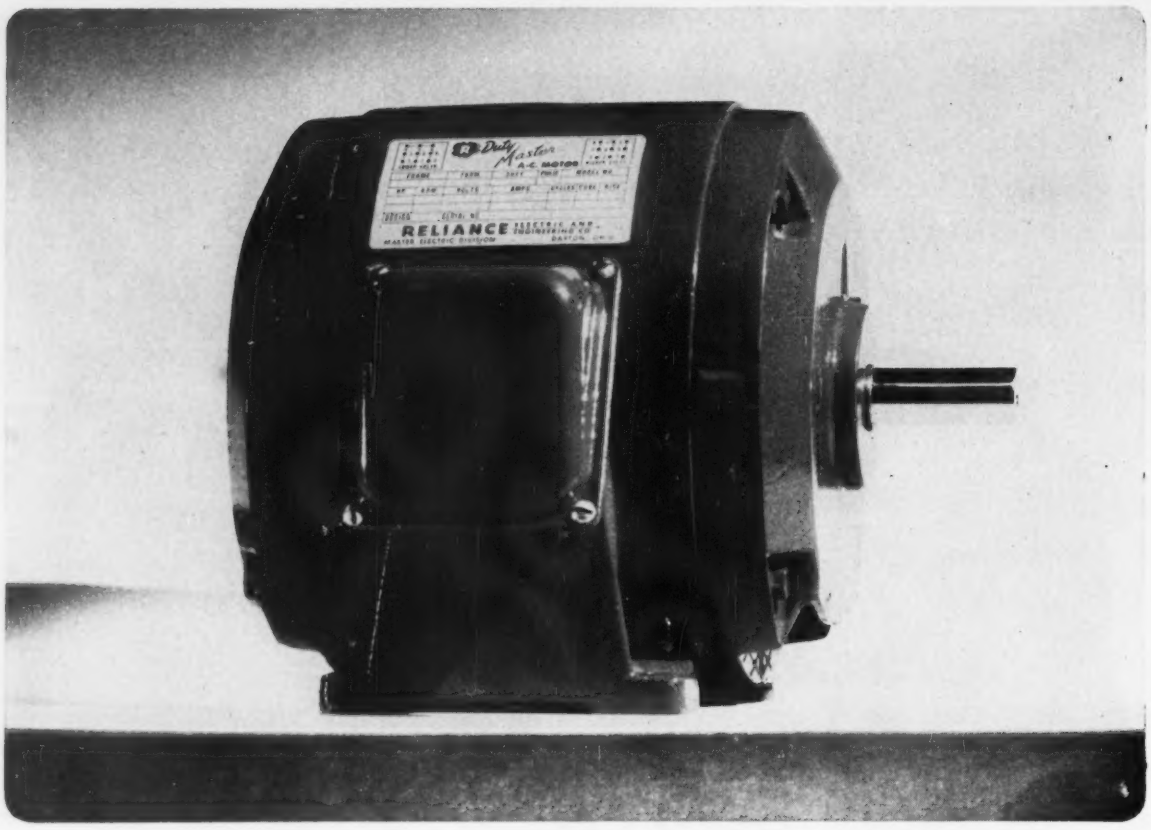

DUTY MASTER

a brand new a-c. motor

Product of Reliance Electric and Engineering Company and its Master Electric Division, Duty Master's new design gives users better protection from the inside out, simplified lubrication, better response and improved all around performance. The Duty Master line, from protected open, to totally enclosed, explosion-proof, 1 to 250 hp., is ready for delivery *NOW*.

Duty Master's insulation, by means of a series of multiple dips and bakes in thermosetting varnish plus final protection in finishing enamel, makes it resistant to water, acid, dirt and other contaminating elements . . . adds years to motor life.

"Metermatic" lubrication regulates flow of grease to the bearing—provides automatic grease relief. No danger of over-or under-lubrication . . . no maintenance headaches.

Duty Master's low inertia rotor has faster response in starting, stopping and reversing. This, plus better ventilation and increased accelerating torques, permits frequent starts and stops without over-heating.

Duty Master's new design proves conclusively that all a-c. motors are *not* alike . . . that this new motor gives users the best value in industry today.

Call your Reliance Sales Engineer or distributor—listed in the Yellow Pages—for the complete story, or write for Bulletin No. B-2106, Reliance Electric and Engineering Company, 24701 Euclid Avenue, Cleveland 17, Ohio.

B-1636

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 411A1, CLEVELAND 17, OHIO
CANADIAN DIVISION: TORONTO, ONTARIO
Sales Offices and Distributors in Principal Cities

MASTER REEVES R

"The most rigid roll specifications can be met with National's modern facilities,"

says Jack Russell, Foundry Superintendent

"The modern equipment now installed at National gives us many checks on quality control in all steps of roll production.

"For instance:

- Flexibility gained by our wide range of furnace sizes permits casting rolls to meet your individual needs.
- Automatic heat treating and quenching equipment with electronic controls assures that more exact physical properties can be attained.
- Testing of steel rolls with the latest in ultrasonic equipment before heat treatment and again prior to shipment assures metallurgical soundness and freedom from flaws.

"These and other steps in the manufacturing, testing and inspection of National rolls—both iron and steel, plain or grooved—result in exceptional performance in rolling mill operations.

"Let National rolls prove this in *your* stands."

GENERAL STEEL CASTINGS

National Roll & Foundry Division

Avonmore (Westmoreland County) Pennsylvania

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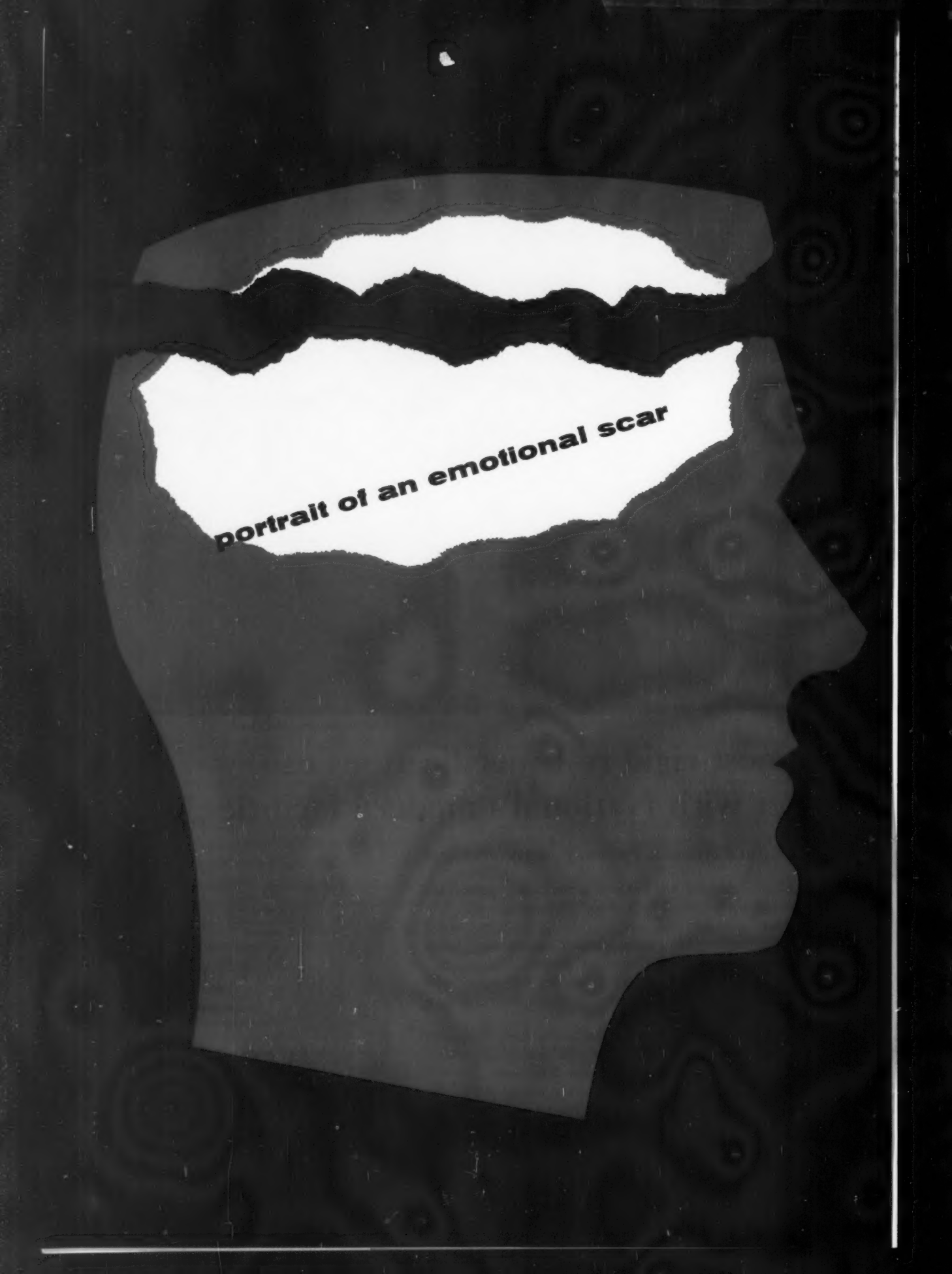
portrait of an emotional scar

How can you depict the shock, anger and disappointment that really takes place when it happens? How does *anybody* know how it feels to see a die crack during the last few minutes of heat treating? How can anybody know, except the man responsible for purchasing the original piece of steel?

What went wrong? Heat treating procedures checked out O.K. And it *should have* been a good piece of steel. It came from a reliable mill that uses all the standard methods of specialty steelmaking and applies all the normal quality controls. Furthermore, tool and die steel from the same mill had been satisfactory on other jobs.

Predictable performance . . . no predicaments. *Carpenter's revolutionary new* MEL-TROL® *process* is not a standard method for making specialty steels. It's exclusive. It utilizes a new patented mold which reduces segregation of harmful impurities during solidification of the ingot. This ingot is far more uniform. You get steel which is cleaner, sounder, tougher from surface to center . . . in every bar . . . in every lot. It takes the guesswork out of toolmaking, because you know *in advance* what results you will get.

Avoid emotional scars. Next time order Tool and Die Steels from your nearby *Carpenter* SERVICE-CENTER. You'll look better in the eyes of your Company.

tool and die steels
stainless steels
electronic, magnetic and electrical alloys
high temperature alloys
special-purpose steels
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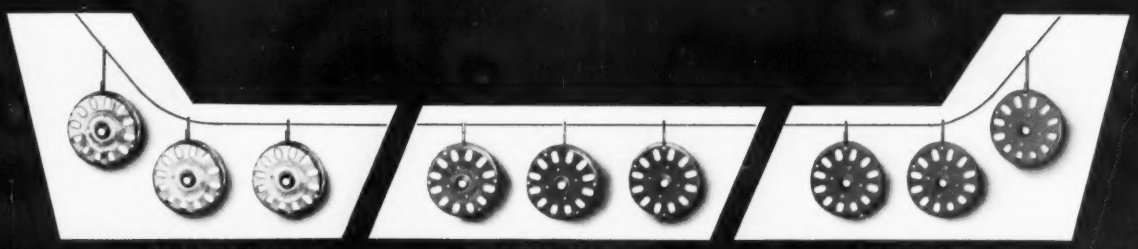
ANNOUNCES

"TRICLENE"

TRICHLORETHYLENE

FINISHING



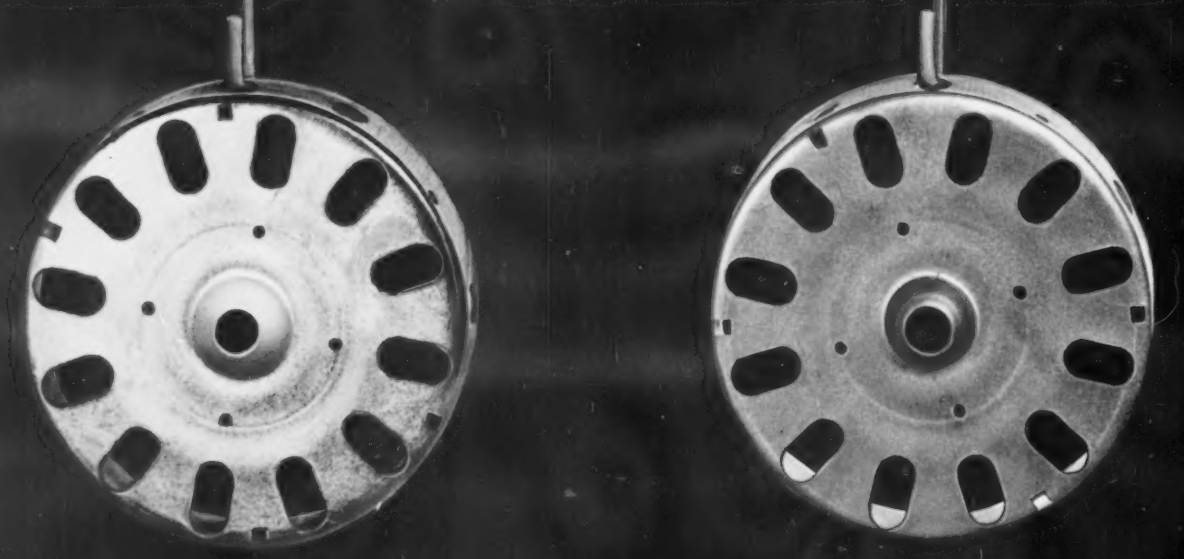
A revolutionary new way to finish metals...
based on Du Pont "Triclene" trichlorethylene

DU PONT

"Triclene" is Du Pont's registered trademark for its trichlorethylene.

Now it is possible to...

CLEAN → PHOSPHATIZE



The production part (shown above) was cleaned, phosphatized and painted in a "Triclene" Finishing unit built by *G. S. Blakeslee & Co.*, Chicago, Ill.

Du Pont "Triclene"® (trichlorethylene) Finishing provides a new, safer way to finish metals – at substantially lower cost!

It cuts overall costs

Low Investment—"Triclene" Finishing cuts equipment cost up to 50% below conventional finishing methods. Because it is an anhydrous system, parts emerge from cleaning and phosphatizing steps completely dry; the need for costly drying ovens is eliminated. The "Triclene" Painting step also eliminates drying ovens and drip pans normally required following conventional painting. Fewer steps mean that in-process parts inventory and conveyor length can be reduced up to 55%.

Low Operating Costs—"Triclene" Finishing can cut operating costs up to 30%. Reason: It permits close to 100% recovery of paint overspray and excess solvent for reuse. Because "Triclene" Finishing is an anhydrous system, heat requirements are drastically reduced.

Reduced Plant Space—"Triclene" Finishing can be done in less than ½ the space because fewer steps are required. For example: a conventional wet cleaning, phosphatizing and dip-painting system requiring 1960 square feet of floor space could be replaced with a "Triclene" Finishing System requiring only 695 sq. ft.

It increases safety

Nonflammable—Trichlorethylene is rated by Underwriters' Laboratories as nonflammable at ordinary room temperatures. Thus fire and explosion hazards are minimized. This means greater plant safety, lower insurance rates and reduced investment in fire protection equipment.

It is flexible

The complete Du Pont "Triclene" Finishing System consists of three basic trichlorethylene-based processes: Vapor Degreasing, Phosphatizing and Painting (see booklet). They can be used in various combinations or incorporated singly into your present finishing system. Various dip or spray cycles can be selected for each of the processes. Both large and small finishing operations can utilize "Triclene" Finishing Processes.

For more detailed information please read the enclosed booklet showing examples of three possible "Triclene" Finishing Systems.

PAINT *continuously...*

in a single medium of nonflammable Triclene® trichlorethylene

more information

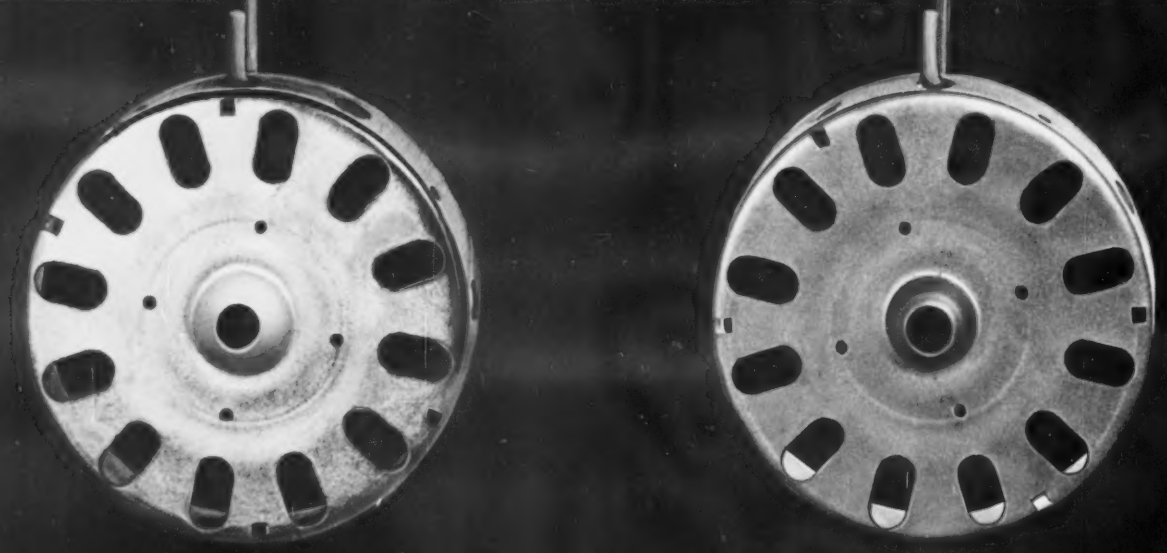
Here are the facts on

3 basic Triclene® Finishing Systems

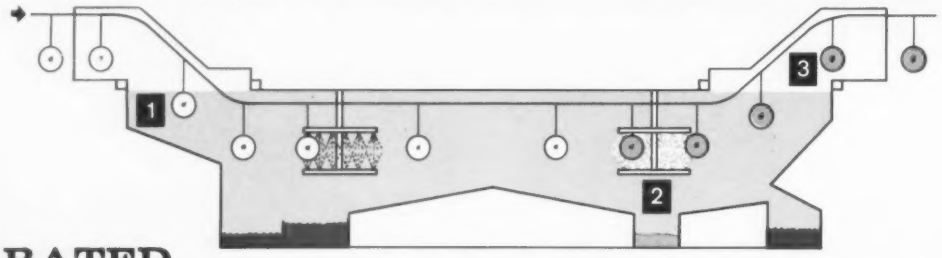
1. *Integrated vapor degreasing and nonflammable painting*
2. *Vapor degreasing and dry phosphatizing*
3. *Vapor degreasing, dry phosphatizing and nonflammable painting*

Now it is possible to . . .

CLEAN → PHOSPHATIZE



Du Pont "Triclene"® Finishing System # 1



INTEGRATED
vapor degreasing and nonflammable painting

The first "Triclene" Finishing System — announced by Du Pont last year — made it possible to integrate cleaning and painting in one compact unit.

HERE'S HOW IT WORKS:

1. A soiled metal part enters the degreasing section of the unit (above) where it is quickly and thoroughly cleaned by trichlorethylene vapor-spray-vapor degreasing.

2. The part moves into the painting section where a new type of industrial paint, thinned solely with nonflammable "Triclene" Paint Grade trichlorethylene, is applied. Spray-In-Vapor method is illustrated; dip painting is also available.

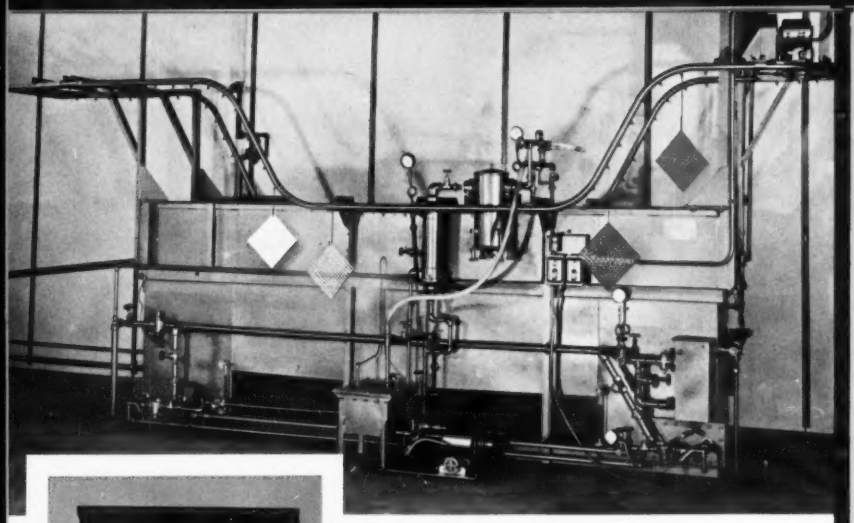
3. The hot, painted part emerges from the unit. Excess solvent quickly evaporates, leaving part completely dry (when lacquers are used), or ready for a short baking step (when curing paints are used).

ADVANTAGES—Integration of cleaning and painting in a single unit drastically reduces equipment size; does away with drip pans; and eliminates the need for a dry-off oven. It also permits close to 100% recovery of paint over-spray and excess solvent for reuse. The amount of "Triclene" solvent recovered from the painting phase will often be enough to run the entire degreasing operation! Nonflammability means greater plant safety, lower insurance rates and less investment for fire protection equipment. These advantages result in substantial cost savings as shown in the comparison at right.

PRESENT STAGE OF DEVELOPMENT—The "Triclene" vapor degreasing and painting system is ready now for general commercial use. A variety of high-quality industrial paints based on "Triclene" trichlorethylene is available. Arrangements can be made to test-paint your parts in demonstration units. (See postcard on back cover.)

PAINT *continuously...*

in a single medium of nonflammable Triclene® trichlorethylene



Demonstration unit for Degreasing/Spray-In-Vapor Painting now in operation at G. S. Blakeslee & Co., Chicago.

This "Lawn King" lawn-spreader is now being dip painted commercially using an air-dry "Triclene" thinned paint.

QUALITY OF WORK—Production experience shows excellent appearance and uniformity of film thickness—even on complex parts. Generally, results are equivalent or superior to those obtainable with conventional dip or flow-coat processes.

COMPARE TOTAL COSTS

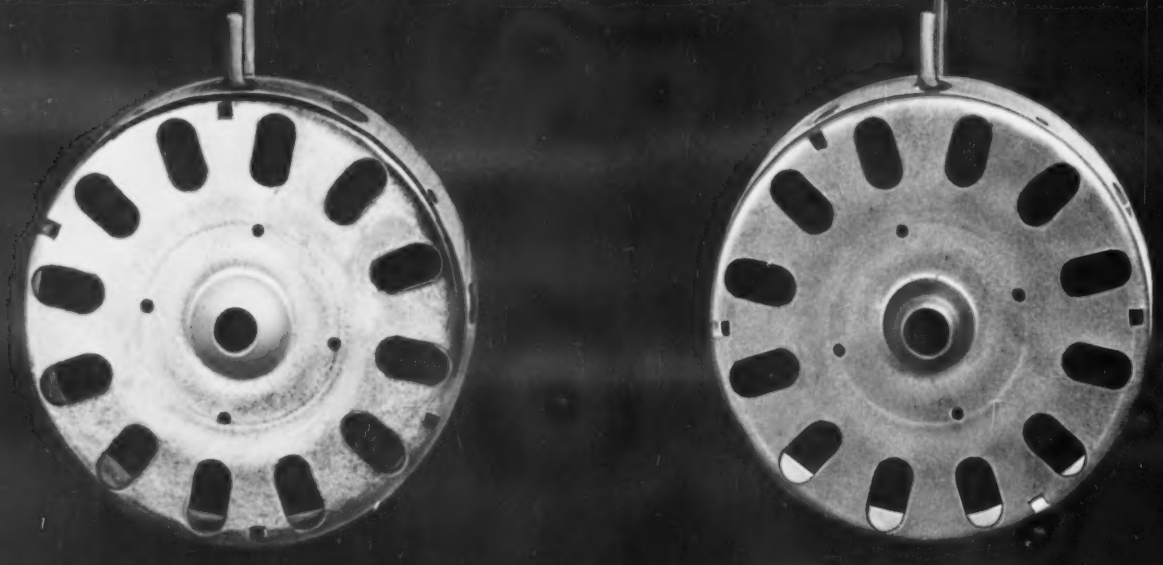
EXAMPLE:
Work: Steel Shelves
Area Painted: 4,200 sq.ft./hr.

CONVENTIONAL METHOD	"TRICLENE" FINISHING
Alkali washing, dip painting, oven drying steps.	Integrated "Triclene" Degreasing and Spray-In-Vapor Painting System.
Total Finishing Cost **$48.40/hr**	Total Finishing Cost **$38.00/hr**
Total Investment Cost **$169,000** (Approx. Equipment Cost—$61,000)	Total Investment Cost **$94,000** (Approx. Equipment Cost—$30,000)
Total Operating Area, Sq. Ft. **1,640**	Total Operating Area, Sq. Ft. **480**

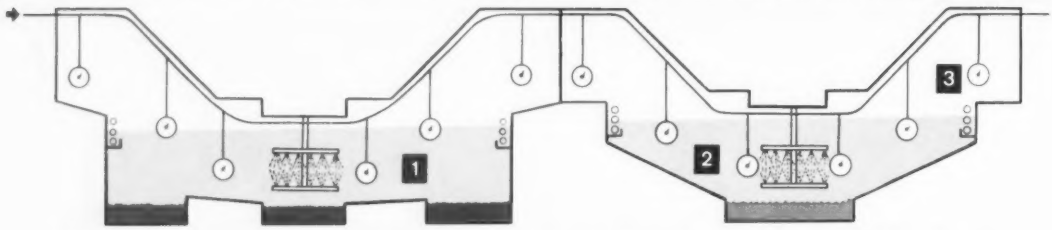
If you're planning to expand or modernize your operation, consider all of the advantages of a "Triclene" Cleaning and Painting System. Du Pont will be glad to help you make a comparative Cost Analysis and to evaluate "Triclene" Finishing for your needs. Fill out postcard on the back page.

Now it is possible to...

CLEAN → PHOSPHATIZE



Du Pont "Triclene"® Finishing System #2



Vapor degreasing and phosphatizing

PRESENT STAGE OF DEVELOPMENT—
After years of research, Du Pont has developed a new anhydrous phosphatizing method based on trichlorethylene. This recently announced development now makes possible linking of the "Triclene" Degreasing and Painting Processes with a compatible anhydrous phosphatizing process.

Although there are two successful full-scale test installations now in operation, "Triclene" Phosphatizing will not be commercially available until mid-1960. This will permit Du Pont to complete extensive field testing of the process. Those who wish to explore the possibility of participation in the field test program, or who wish to plan for future modernization, can evaluate "Triclene" Phosphatizing now.

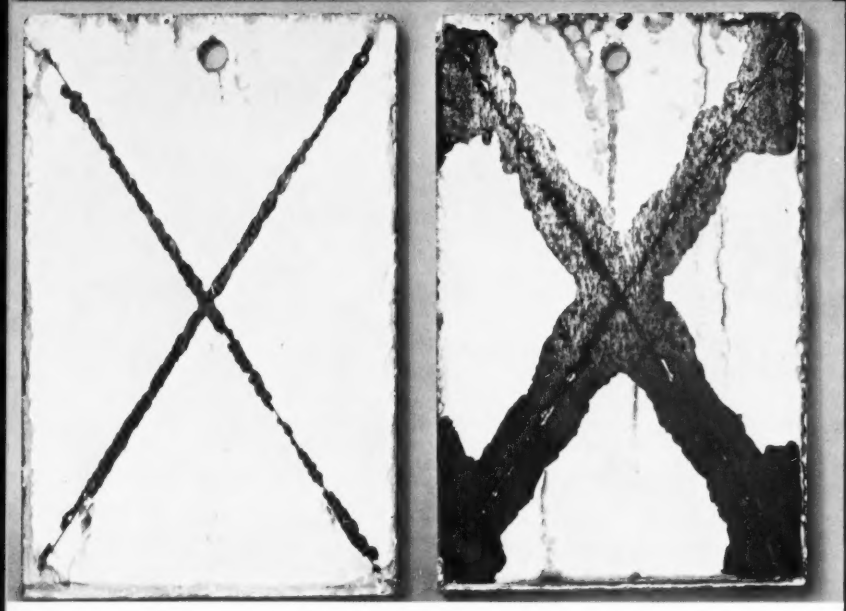
This "Triclene" System combines vapor degreasing and dry phosphatizing; requires just two compact units.

HERE'S HOW IT WORKS: A soiled metal part enters the two-stage system (No. 1 above) where it is thoroughly cleaned by trichlorethylene vapor-spray-vapor degreasing. The part then enters the phosphatizing stage (2) where it is treated in the anhydrous phosphatizing composition. When the phosphatized part emerges from the trichlorethylene vapor (3) the solvent evaporates and the part is completely dry and ready for "Triclene" Painting, conventional painting, or in-plant storage or shipping.

ADVANTAGES—Anhydrous "Triclene" Degreasing/Phosphatizing takes as little as one-half the time and space of conventional wet systems. Heat requirements are reduced sharply and no dry-off step is needed prior to painting. These advantages result in substantial cost savings as shown in the comparison at right.

PAINT *continuously...*

in a single medium of nonflammable Triclene® trichlorethylene



Standard salt-spray exposure test shows quality of "Triclene" phosphatizing: The steel panel on the left was cleaned and phosphatized in a "Triclene" Finishing System and compared with unphosphatized-painted steel after standard salt-spray exposure for 600 hours. As indicated by the minimum corrosion at the scribe mark, the "Triclene" Phosphatized panel shows significantly improved finish performance.

QUALITY OF WORK—"Triclene" Phosphatizing produces an adherent phosphate conversion coating with improved corrosion resistance. In addition, the phosphate coating alone is remarkably resistant to rusting. This unique property benefits the steel fabricator who wishes to store or ship his parts prior to painting.

COMPARE TOTAL COSTS

EXAMPLE:
Work: Steel Shelves
Area Painted: 4,200 sq.ft./hr.

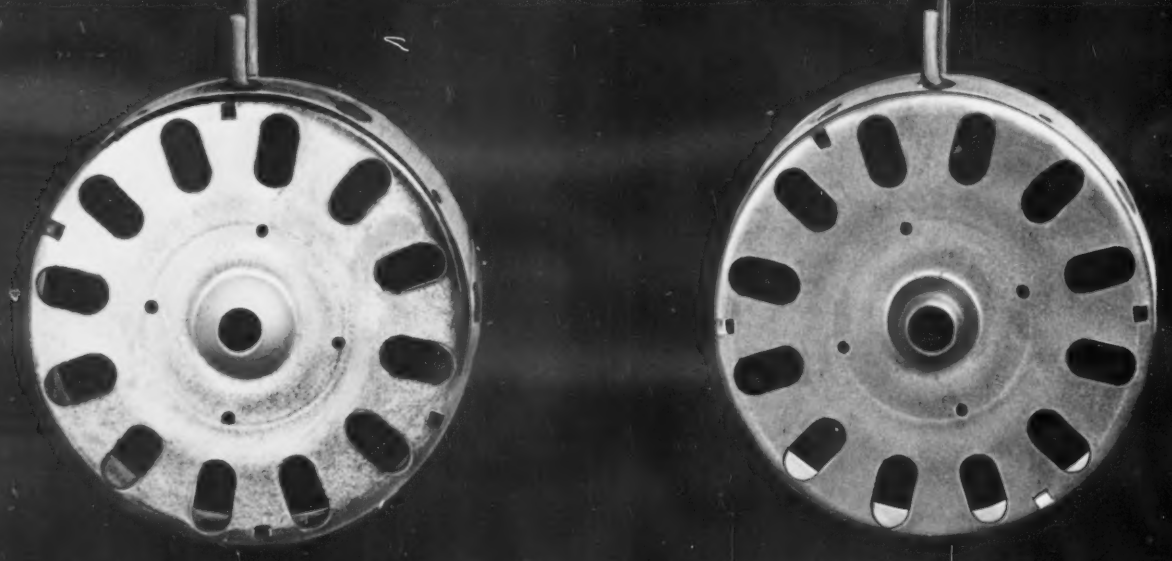
CONVENTIONAL METHOD	"TRICLENE" FINISHING
Alkali washing, "wet" phosphatizing, oven drying steps.	"Triclene" Degreasing/Phosphatizing System.
Total Cleaning/ Phosphatizing Cost....$12.00/hr	Total Cleaning/ Phosphatizing Cost....$8.30/hr
Total Investment Cost.....$73,600 (Approx. Equipment Cost—$33,000)	Total Investment Cost.....$45,500* (Approx. Equipment Cost—$27,000)
Total Operating Area, Sq. Ft. 760	Total Operating Area, Sq. Ft. 456

*The relative cost advantage for the high-production system illustrated is also attainable with smaller operations.

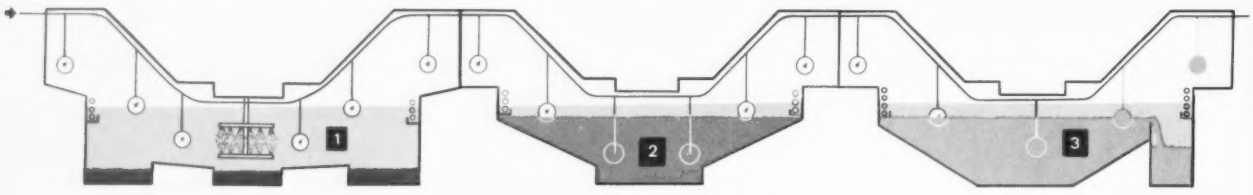
If you're planning to expand or modernize your operation, Du Pont will be glad to help you make a comparative Cost Analysis and to evaluate "Triclene" Degreasing and Phosphatizing for your needs. Fill out postcard on the back page.

Now it is possible to . . .

CLEAN → PHOSPHATIZE



Du Pont "Triclene"® Finishing System #3



Vapor degreasing, phosphatizing* and painting

This is the complete "Triclene" Metal Finishing System—the ultimate in processing efficiency.

HERE'S HOW IT WORKS: A soiled metal part enters this three-stage unit (above) and is: (1) thoroughly cleaned by trichlorethylene vapor-spray-vapor degreasing . . . (2) phosphatized during one short immersion in the phosphatizing solution . . . (3) dip painted with "Triclene" Paint Grade trichlorethylene thinned paint. Finished part emerges from the unit completely dry when lacquer is used or ready for a short baking step in the case of curing paints. (Spray-In-Vapor painting, not shown, is available.)

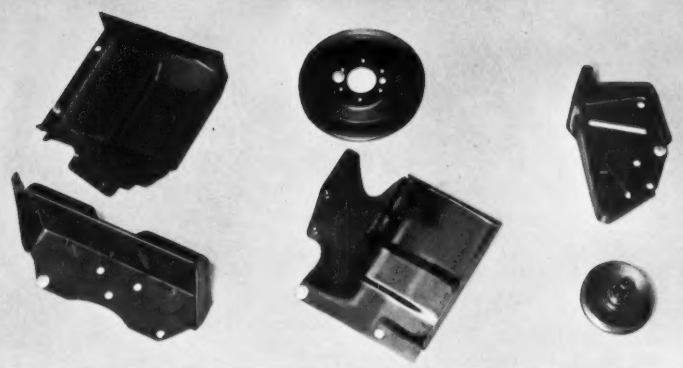
ADVANTAGES—The complete Du Pont "Triclene" Finishing System consists of three compact steps. (If baking enamels are used, a fourth but shortened baking step is required.) Conventional systems take up to 12 steps to do the same job. Nonflammable "Triclene" Finishing cuts insurance and fire protection costs—safeguards plant investment. The lower equipment costs and heat and floor space requirements all result in appreciable savings, as shown in the cost comparison at right.

QUALITY OF WORK—Combining the "Triclene" Processes into one complete system produces a finish which exhibits improved adhesion and corrosion resistance, and excellent appearance.

**Present Stage of Development:* Although a large automotive manufacturer is now using the complete "Triclene" Finishing System, the phosphatizing stage will not be available for wide commercial use until mid-1960. This will permit Du Pont to complete field trials on the "Triclene" Phosphatizing Process. Those who wish to explore the possibility of participation in the Field Test Program, or who are planning future modernization, can evaluate "Triclene" Phosphatizing now. (Fill out postcard on back page.) As stated previously, "Triclene" Degreasing and Painting are commercially available now.

PAINT *continuously...*

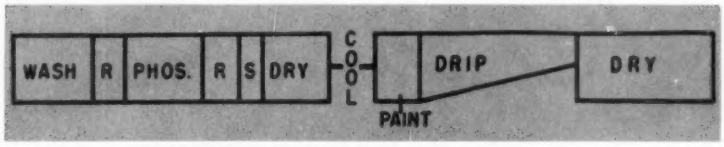
in a single medium of nonflammable Triclene® trichlorethylene



• These automobile engine production parts were vapor degreased, phosphatized and painted in a "Triclene" System similar to the one diagramed at left.

Compare Operating Areas

CONVENTIONAL METHOD requires 1,960 sq. ft.



"TRICLENE" FINISHING requires 695 sq. ft.

COMPARE TOTAL COSTS

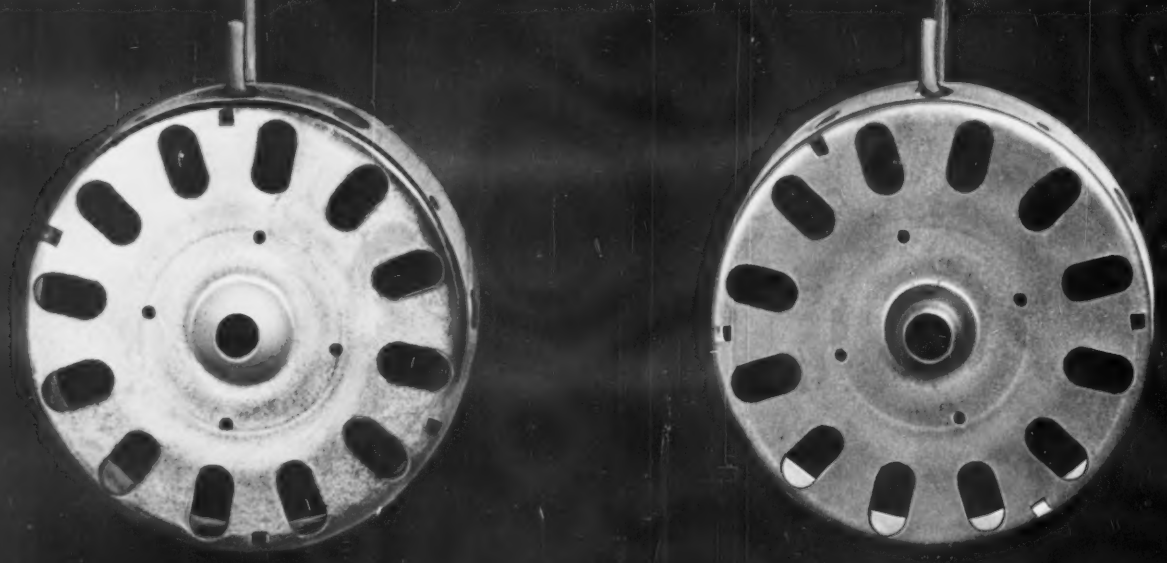
EXAMPLE:
Work: Steel Shelves
Area Painted: 4,200 sq.ft./hr.

CONVENTIONAL METHOD	"TRICLENE" FINISHING
Alkali washing, wet phosphatizing, dip painting, oven-drying steps.	Vapor degreasing, phosphatizing, painting.
Total Finishing Cost....$54.30/hr	Total Finishing Cost....$41.70/hr
Total Investment Cost ....$200,000 (Approx. Equipment Cost—$73,000)	Total Investment Cost ....$122,000 (Approx. Equipment Cost—$42,000)
Total Operating Area, Sq. Ft. 1,960	Total Operating Area, Sq. Ft. 695

If you're planning to expand or modernize your operation, consider all of the advantages of a complete "Triclene" Finishing System. Du Pont will be glad to help you make a comparative Cost Analysis and to evaluate "Triclene" Finishing for your needs. Fill out postcard on the back page.

Now it is possible to . . .

CLEAN → PHOSPHATIZE



Here's what to do if you are interested in evaluating "TRICLENE"® FINISHING for your operation

Fill out and return the postcard at right. If you indicate a general interest, Du Pont will mail you technical literature describing the processes; if you indicate a specific or immediate need for evaluation, Du Pont will initiate the following evaluation program:

1 Finishing Analysis

Du Pont will provide you with detailed process literature and a Finishing Data Sheet which, when filled out by you, will give Du Pont the information needed to answer these three important questions:

1. *Will "Triclene" Finishing maintain or improve your quality standards?*
2. *Is "Triclene" Finishing mechanically applicable in your particular case?*
3. *What cost advantage can you expect to realize from adoption of a "Triclene" Finishing System?*

Preliminary answers to these questions will be presented in a complete *Finishing Analysis* which will include estimates of equipment size and cost plus a confidential "High-Spot" finishing cost comparison of the recommended "Triclene" System with the equivalent conventional system.

PAINT *continuously...*

in a single medium of nonflammable Triclene® trichlorethylene

2 Product Evaluation and Equipment design

If Du Pont's Finishing Analysis shows that a "Triclene" Finishing System appears applicable to your particular operation, Du Pont will then make arrangements to supply you with panels and parts necessary for you to evaluate the finish produced by the "Triclene" System. Du Pont will then work with the paint and equipment manufacturers to translate laboratory-scale results into a well-designed full-scale system.

3 Help in Start-up

When you install equipment for "Triclene" Finishing you can count on Du Pont assistance through the important start-up period. Du Pont will work with you and your paint and equipment suppliers—will be glad to advise on installation, start-up and operating procedures.

4 Follow-through Service

You can obtain continuing Du Pont service after your "Triclene" System is in operation. A trained Du Pont representative will check with you regularly . . . and will be available when you need technical help.

Fill out this card and mail to Du Pont

I'm interested in evaluating DuPont "Triclene" Finishing for

☐ **CLEANING** ☐ **PHOSPHATIZING** ☐ **PAINTING**

☐ I would like technical literature describing these processes.

☐ Our Company would consider replacement of existing equipment if we can be shown economic justification. Please send me your Finishing Data Sheet.

☐ We have an immediate need for new finishing equipment to be installed by_____ (target date)

Please have your representative contact me.

Please fill out completely:

Describe parts you finish_____

_____

_____

Type of process you now use for:

☐ Metal cleaning_____

☐ Phosphatizing_____

☐ Painting_____

Name_____

Position_____

Firm_____

Address_____

City_____ Zone____ State_____

DuPont makes two trichlorethylene products for use in "Triclene" vapor degreasing and painting

1. "Triclene" D Metal Degreasing Grade trichlorethylene—long recognized as the "standard of the industry". Its consistent high quality means top performance under all operating conditions. Reason: an exclusive combination of neutral stabilizers that resist deteriorating influences, thus assuring longer solvent life. "Triclene" D leaves parts bright and clean, free from deposits, staining, etching; keeps degreaser coils free of sludge; reduces costly downtime and maintenance. "Triclene" D is easily recoverable for reuse.

2. "Triclene" Paint Grade trichlorethylene was especially developed to serve as the thinner for a new class of industrial paints for use in Du Pont's "Triclene" Painting Processes. This special grade of nonflammable trichlorethylene contains a new (neutral) stabilizer formulation which minimizes gelation at process temperature and avoids discoloration of the lightest paint shades. At the same time it maintains the same high standard of stability for which Du Pont's degreasing grade trichlorethylene is well known and can be recovered for reuse in degreasing operations.

NOTE: Du Pont's "Triclene" Phosphatizing Grade trichlorethylene, which is now under field test, will be commercially available in mid-1960 when the phosphatizing process will be ready for general use.

Metal degreasing and paint grades of "Triclene" trichlorethylene are available now from any of these Du Pont distributors:

ARIZONA
Western Chemical & Mfg. Co.

CALIFORNIA
Atlas Mfg. & Chem. Co.
Baron Industries
L. H. Butcher Co.
Currier Company
Hanson-Van Winkle-Munning Co.
Chas. F. L'Hommedieu & Sons Co.
Los Angeles Chemical Co.
Reese Supply Co., Inc.
Western Chemical & Mfg. Co.

COLORADO
Braun-Knecht-Heimann Co.

CONNECTICUT
Crane Equipment & Supply Co.
Enthone, Inc.
Hubbard-Hall Chem. Co.
Mac Dermid, Inc.

FLORIDA
Biscayne Chem. Labs, Inc.
Lenfesty Supply Co.

GEORGIA
McKesson & Robbins, Inc.

ILLINOIS
Central Solvents & Chems. Co.
Dico Co., Ltd.
Industrial Oil & Chem. Co.
McKesson & Robbins, Inc.
The Udylite Corp.

INDIANA
Hoosier Solvents & Chemicals Corp.
Wm. Lynn Chemical Co., Inc.
Stevens Co.

IOWA
Dico Corp., Ltd.
Kennedy & Parsons Co.
McKesson & Robbins, Inc.

KANSAS
McKesson & Robbins, Inc.

KENTUCKY
Dixie Solvents & Chemicals Co.

LOUISIANA
Southern Solvents & Chemicals Co.

MASSACHUSETTS
Borden & Remington Co.
Chemical Sales & Service Co., Inc.
Doe & Ingalls
Eastern Chemicals, Inc.
Hamblet & Hayes Co.
Howe & French, Inc.
McKesson & Robbins, Inc.
Textile Aniline & Chem. Co.
Worcester Chemical Distributors, Inc.

MICHIGAN
Carrier-Stephens Co.
Eaton Chemical & Dyestuff Co.
Ecclestone Chemical Co., Inc.
Hanson-Van Winkle-Munning Co.
The Udylite Corp.
Western Solvents & Chemicals Co.
Wolverine Solvents & Chemicals Co.

MINNESOTA
W. D. Forbes Co.
Lyon Chemical Co., Inc.
McKesson & Robbins, Inc.
Worum Chemical Co.

MISSOURI
Jenkins-Guerin, Inc.
Missouri Solvents & Chemicals Co.

NEBRASKA
McKesson & Robbins, Inc.

NEW HAMPSHIRE
New England Chemical Supply Co.

NEW JERSEY
Brown Chemical Co.
Chemical Solvents, Inc.
Dooner & Smith Chemical Co.
McKesson & Robbins, Inc.

NEW YORK
Buffalo Solvents & Chem. Corp.
Duso Chemical Co., Inc.
Eastern Chemicals, Inc.
Empire Electroplating Supply Co.
Enequist Chemical Co.
McKesson & Robbins, Inc.
Riverside Chemical Co., Inc.
The Udylite Corp.
West Side Corp.

OHIO
Amsco Solvents & Chemicals Co.
The Bison Corp.
Wm. Buchanan Supply Co.
Farley Chemical & Solvents Co.
Industrial Chemical Products Co.
Ohio Solvents & Chemicals Co.
Pol-O-Plate Products
Superior Chemical Products Co.
Thomson Chemical Co.
Toledo Solvents & Chemicals Co.
The Udylite Corp.

OREGON
L. H. Butcher Co.

PENNSYLVANIA
Belco Supplies, Inc.
Carman-Pittsburgh
Chemclene Corp.
Fort Pitt Chemical Co.
Industrial Solvents & Chemicals Co.
McKesson & Robbins, Inc.
Merchants Products Corp.
George A. Rowley Co., Inc.
Textile Chemical Co.
The Udylite Corp.

RHODE ISLAND
American Chemical Works
Borden & Remington Co.
Brian Supply Co.
Conley & Straight, Inc.
John D. Lewis, Inc.

TENNESSEE
Burkart-Schier Chemical Co.
Ideal Chemical & Supply Co.

TEXAS
Texas Solvents & Chemicals Co.

UTAH
L. H. Butcher Co.

VIRGINIA
Phipps & Bird, Inc.

WASHINGTON
L. H. Butcher Co.

WEST VIRGINIA
Pennsylvania & W. Virginia Supply Corp.
W. T. Rife & Co., Inc.

WISCONSIN
Donald Sales & Mfg. Co.
McKesson & Robbins, Inc.
O'Donohue Sales Co.
Wisconsin Solvents & Chemicals Corp.

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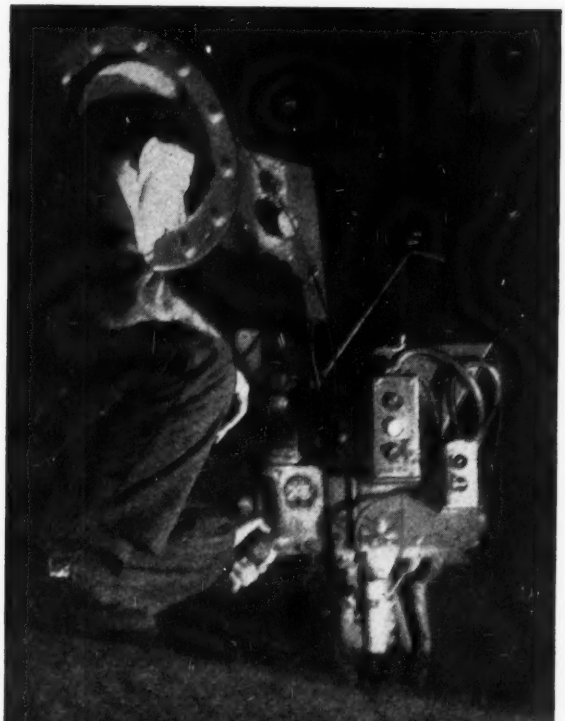
"TRICLENE" FINISHING
TRICHLORETHYLENE

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

PRINTED IN U.S.A.

A-124



Business is booming
at R & R Tank Company!
And now profits are rolling in.

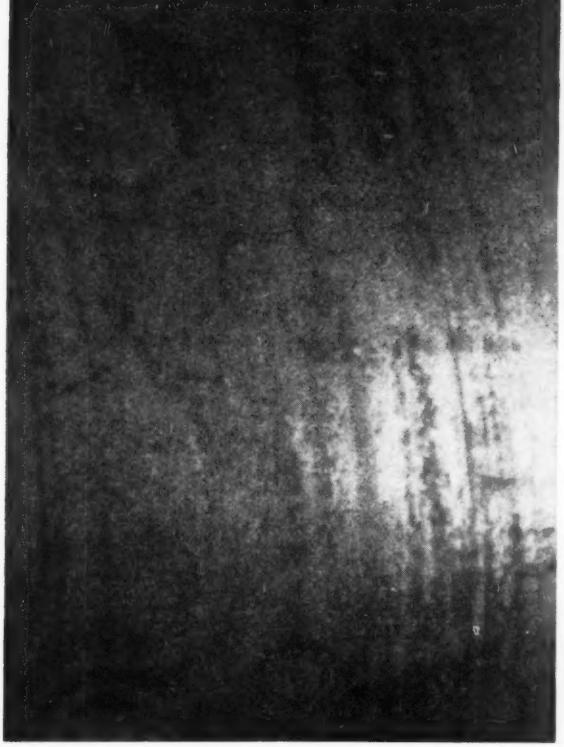
Six months ago, welding costs
were twenty-five to thirty percent higher.
And the profit squeeze was tight.
But no longer!

New production methods
and faster, superior equipment
and electrodes turned the tide.

"How did we accomplish this?
The easiest way possible", says
Mr. Floyd Reinhardt, R & R's president.
"We called in the man who
knows most about welding procedures—
the Lincoln Welding Engineer.

"He suggested some easy changes
which were routine to him, I guess,
but they were news to us."

Costs slashed 25% on tank production



RESULTS: A change in fabricating sequence
plus a switch to "Jetweld 1", iron-powder electrodes
saved 25% through faster welding and easier cleaning.
The three new "Lincolnweld" automatics
increased production and cut the
automatic welding costs by 30%.

Do you want to save time and money
on your welding operations?
Call your Lincoln Welding Engineer today!

LINCOLN

THE LINCOLN ELECTRIC COMPANY
Dept. 1659 • Cleveland 17, Ohio
The World's Largest Manufacturer of Arc Welding Equipment

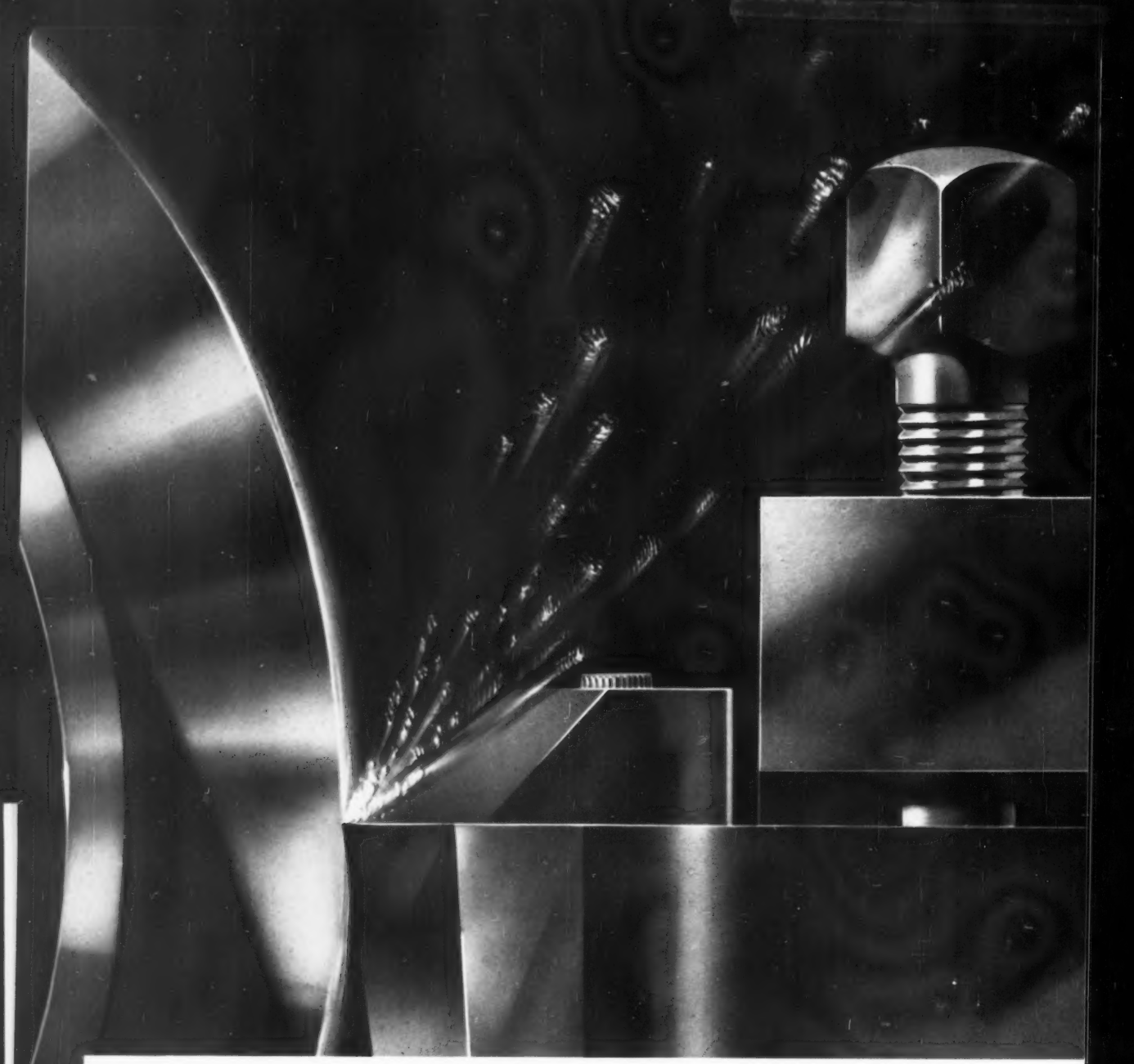


Illustration of Malleable casting being turned at 1,400 surface feet per minute with a 0.100" depth of cut using an oxide tool.

Machinability is Malleable

It's the finished cost of machined components that's important to you. Remember then . . . Malleable iron is more machinable than any other ferrous metal of similar properties. With Malleable castings you'll reduce machining time as much as 50% . . . increase tool life up to 250% . . . get unexcelled surface finishes . . . and end your reject problems.

To find out how much you can cut your costs and improve your profits, contact one of the progressive firms that displays this symbol—

MEMBER
MALLEABLE
CASTINGS COUNCIL

If you wish, you may inquire direct to the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, for information.

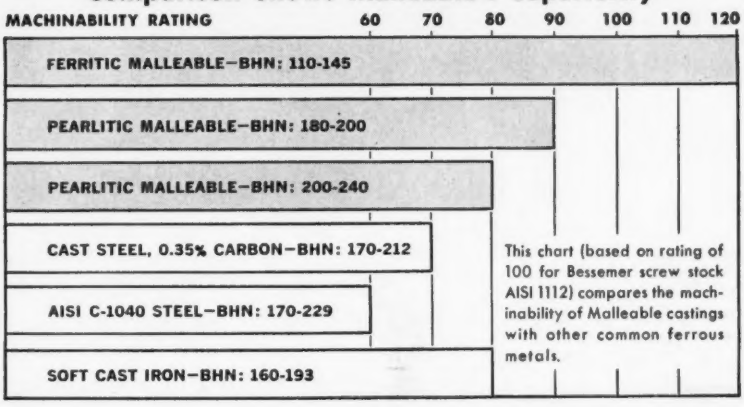
Machining Malleable Castings—Important Key to Cost Reduction

Malleable castings—the most machinable of all ferrous metals—cut quality components costs

Production men know that machining time, power consumption and rejects drop with the use of Malleable iron castings, while tool life and profits shoot up. The reason is simple: Malleable iron is the most machinable of all ferrous metals of similar properties.

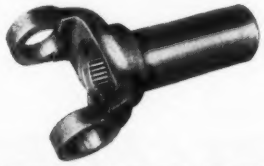
The following important factors work together to give Malleable such machining superiority: Malleable's microstructure contains tiny, evenly distributed nodules of carbon that help cutting tools quickly break the removed metal into small (Class A) chips; the carbon also acts as a lubricant, prolonging tool life; uniformity of properties throughout every casting permits running at optimum machining conditions.

Comparison Shows Malleable's Superiority



Typical Example Shows Savings of 70% to 250%

The conversion of automotive universal joint yokes from steel forgings to pearlitic Malleable castings typifies the savings provided by Malleable castings. Costs for the rough pieces and performance characteristics of the two materials are comparable. However, the castings are much more economical to machine. Considering that machining often costs two to four times as much as the rough parts, the economy resulting from using Malleable castings is substantial.



Conversion of this universal joint yoke to a Malleable casting increased production, lowered direct and tool room labor, and cut tool replacement.

One volume user of Malleable joint yokes reports the following savings after changing from steel to Malleable castings: 70% longer tool life in broaching the splines; 250% more pieces cut by the nut seat cutters; 149% more pieces in turning and facing the hub; an increase of 100% in production between wheel dressings in grinding the hub; 246% greater production in drilling the cross holes.

In each of these operations, the change to Malleable castings cuts direct production time by reducing the frequency of tool changes. Tool room labor and tool replacement are both reduced to fractions of their previous costs.

Throughout the metalworking industry, part after part is now being initially designed of Malleable or converted from other materials to take advantage of Malleable's unrivalled machinability . . . to produce better parts at lower costs.

New Information Now Available on Machining Malleable

Data Unit 106—Machinability of Malleable Castings—can be obtained from any member of the Malleable Castings Council, or from the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

These companies are members of the

MALLEABLE CASTINGS COUNCIL

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Link-Belt Company, Indianapolis 6
Muncie Malleable Foundry Co., Muncie
National Mall. & Steel Castings Co., Indianapolis 22
Terre Haute Mall. & Mfg. Corp., Terre Haute

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW JERSEY
Meeker Foundry Company, Newark 4

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

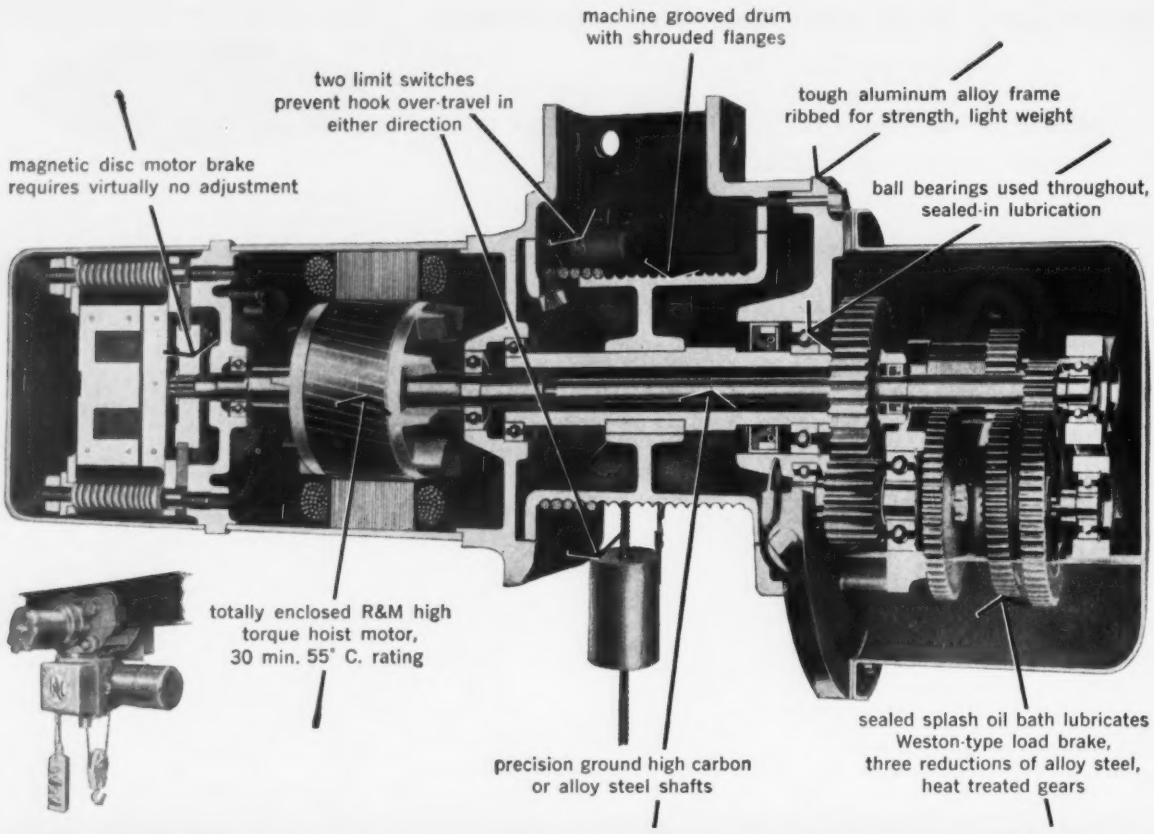
OHIO
American Malleable Castings Co., Marion
Canton Malleable Iron Co., Canton 5
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46



all new! hoist you'd build

R&M Type J hoists, now redesigned, give you the same quality engineering features *throughout* the line that have made Robbins & Myers hoists tops in industrial value. In the low price field the new Type J hoist features a trouble-free disc type motor brake for driftless spotting, and a sturdy Weston-type load brake. Upper and lower jam-proof limit switches, three gear reductions, and liberal use of ball bearings insure reliability. Robbins & Myers hoist motor has the highest time rating found in any low cost hoist—30 min., 55° C. This is the way you'd build it; the price is right, too.

Capacities: ¼, ½, 1, and 2 tons. Lug mounting and push-button control are standard. Push, hand geared, and motor driven trolleys available.

Robbins & Myers, Inc., Hoist & Crane Division, Springfield, O.

take it up with

ROBBINS & MYERS

hoists cranes

Request Bulletin 905 today

Revere helps "fit the metal to the job"

AND A MAKER OF MEDICINE CABINET MIRROR FRAMES SAVES $10,000 A YEAR

As a result of a suggestion made by one of Revere's Technical Advisors, a maker of mirror frames for medicine cabinets has saved $10,000 a year on polishing costs alone. The suggestion was that, by changing to a brass of different grain size, the manufacturer might be able to save money on polishing costs and at the same time improve the quality of his product. (The 90° bend to which the mirror frames are subjected also had to be taken into consideration.)

Samples were made using a Revere Brass Strip with a smaller grain size as recommended by the Technical Advisor. Tests showed that, as a result of the change the manufacturer was able to realize a saving of 17¢ per mirror frame on polishing costs alone, with no increased costs in other operations, including the 90° bend. Based on the saving per frame this manufacturer has saved $10,000 per year for the past 4 years!

Here is still another example of how Revere's Technical Advisory Service working with the customer and the mill helped "fit the metal to the job," thus saving the customer money as well as improving product quality.

Why don't you take advantage of the extensive knowledge of Revere's Technical Advisory Service in "fitting the metal to the job?" It's entirely possible this service can save you money . . . help improve the quality of *your* product.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Executive Offices: 230 Park Avenue, New York 17, N. Y.

Mills: Rome, N. Y.; Baltimore, Md.; Chicago, Clinton, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Fort Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.

Check your requirements against these

Wallace Barnes Cold-rolled Specialty Steels

Furnished in these carbon grades:

1.25 – 1.32% .90 – 1.05% .70 – .80% .59 – .74% .48 – .55%

ANNEALED AND HARD-ROLLED

Thickness

.003 – .010″	in widths	1/8 to 6 1/4″	
.011 – .014″	“ “	3/16 to 11″	
.015 – .019″	“ “	3/16 to 13″	
.020 – .035″	“ “	1/4 to 13″	
.036 – .049″	in widths	3/8 to 13″	
.050 – .064″	“ “	1/2 to 13″	
.065 – .093″	“ “	3/4 to 6 1/4″	
.093 – .125″	“ “	3/4 to 6 1/4″	

HARDENED AND TEMPERED

Scale-free or scaleless; polished*; polished and blued*; polished and strawed*

Thickness

.003 – .004″	in widths	1/8 to 2″	
.005 – .007″	“ “	1/8 to 3″	
.008 – .009″	“ “	1/8 to 4″	
.010 – .014″	“ “	3/16 to 5″	
.015 – .019″	“ “	3/16 to 7″	
.020 – .025″	“ “	1/4 to 8 1/2″	
.026 – .030″	“ “	1/4 to 8″	
.031 – .035″	in widths	1/4 to 7″	
.036 – .040″	“ “	3/8 to 7″	
.041 – .049″	“ “	3/8 to 6″	
.050 – .060″	“ “	1/2 to 4″	
.061 – .064″	“ “	1/2 to 3″	
.065 – .093″	“ “	3/4 to 3″	

*Maximum width for polishing in .010 – .030 thickness ranges is 5 in.

Facilities for processing alloy steels also are available.

Standard sizes normally available for prompt shipments.

Write for a copy of “Physical Property Charts” that give performance characteristics of .90 – 1.05% and .70 – .80% carbon grades.

Wallace Barnes Steel Division

Bristol, Connecticut

Associated Spring Corporation

NEWEST and FASTEST Production Tool for Metalworking!

TYPE 101

METALITE®

ANOTHER DEVELOPMENT OF **BEHR-MANNING CO.**
TROY, NEW YORK
A DIVISION OF NORTON COMPANY

METALITE 101 Discs and Belts come with "built-in zip" to speed production

Here is the perfect disc for roughing or cutting down projections such as weld beads. TYPE 101 METALITE FIBRE Discs run cool — giving fantastic mileage.

Want to lick high finishing costs? . . . try the new TYPE 101 RESINALL METALITE Cloth Belts for uniform grinding and faster finishing. Ask your BEHR-MANNING representative for a free demonstration . . . or write for information to Dept. IA-10.

BEHR-MANNING CO.

TROY, NEW YORK

A DIVISION OF NORTON COMPANY

NORTON ABRASIVES®

BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes • Floor Maintenance Products
NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals
In Canada: Behr-Manning (Canada) Ltd., Brantford. • For Export: Norton International, Inc., Troy, New York, U. S. A.

with complete atmosphere control

GENERAL ELECTRIC OFFERS NEW ATMOSPHERE PRODUCERS FOR ELECTRIC AND GAS FURNACES

A complete line of new General Electric Exalene, Neutralene, Thermalene, and Ammalene atmosphere producers are available in "packaged" units. They're pre-piped, pre-wired and pretested to simplify and speed installation. And these attractive G-E producers give you ease and economy of operation and maintenance . . . measures of General Electric dependability.

G-E atmosphere producers can save you money . . . in production costs, because protective atmospheres prevent oxidation and decarburization. Costly machining is eliminated, and your product's quality is often improved. Material cost is less since you can produce your own low cost substitutes for hydrogen and nitrogen.

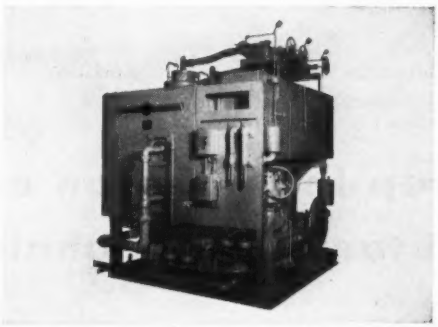
Flexibility, another money saving General Electric feature, provides for adjustment and control of the gas composition . . . you get just the mixture you need for the application.

When you purchase General Electric protective atmosphere equipment, you get the right equipment properly installed. And you can be sure that expert General Electric engineers, and service facilities are as near as your phone.

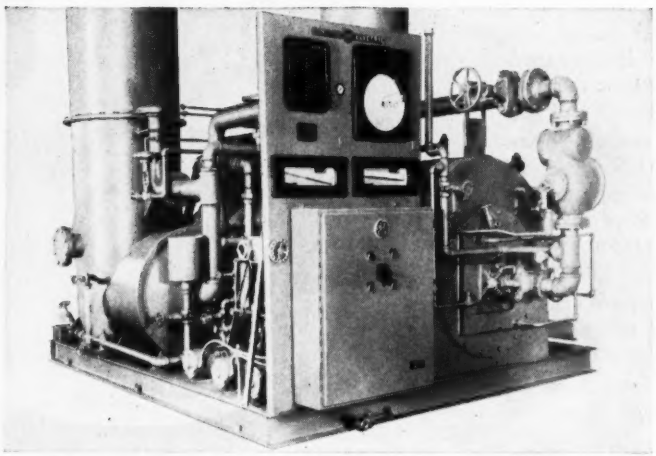
For more information, contact your nearby G-E Apparatus Sales Office, or write Section 721-27, General Electric Co., Schenectady 5, New York.

GENERAL ELECTRIC

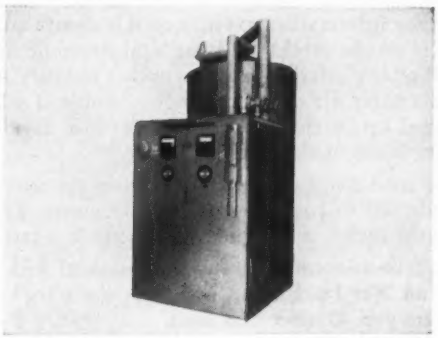
EXALENE PRODUCER for exothermic gas, lowest cost, most widely used gas, to 30,000 cfh.



THERMALENE PRODUCER for endothermic gases to 3600 cfh with minimum of maintenance.



NEUTRALENE PRODUCER for purified exothermic gas. This economical G-E equipment available to 20,000 cfh. Also available with CO removal equipment.



AMMALENE PRODUCER for low-cost, high-purity hydrogen substitute to 8000 cfh.

HOW YOUR REPUBLIC BOLT AND NUT DISTRIBUTOR CAN HELP YOU...

Keep informed on advanced fastening techniques

The art of industrial fastening is subject to constant change, and keeping abreast of it requires close contact with new developments in products and methods. Probably you yourself do not have the time nor the facilities to keep informed in every detail.

But any information you may need is always quickly available when you rely on the services of your local Republic Bolt and Nut Distributor. Keeping informed on the fastener industry is a vital aspect of his business. And his own know-how, combined with that of his staff, is backed up by the experts of Republic Steel—a company whose fastener background spans a century.

Your local distributor can quickly help you select the type of fastener best adapted to your special requirements. Then he can give you prompt delivery in any quantity—one bolt, a case, or truckload.

You'll be wise to become well acquainted with your local Republic Bolt and Nut Distributor, and with the complete range of services he offers you. Contact him soon.

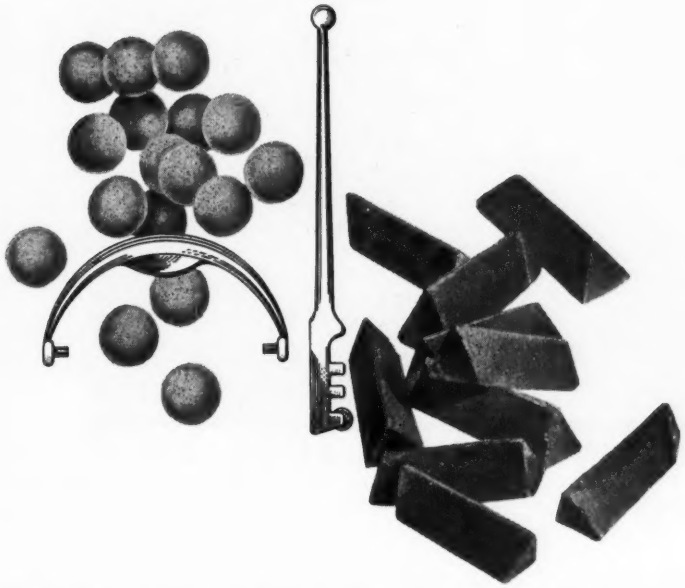
Call your local distributor for quick deliveries of...

REPUBLIC Bolts and Nuts

REPUBLIC STEEL

Barrel Finishing is best finishing

...with TUMBLEX bonded abrasives*



Your sure way to cut finishing costs-per-piece is to combine the best barrel finishing techniques with the best abrasives. Norton can help you make the right choices.

Among the wide variety of Norton barrel finishing abrasives, bonded TUMBLEX abrasives are made of ALUNDUM* abrasive in four shapes — "T" triangles, "S" spheres, "TP" triangular pins, "RP" round pins. Available in many sizes, they provide fine, uniform finish, short-time cycles, long, even wear and sure savings on many finishing jobs.

Send samples of parts you finish to our Sample Processing Department. We'll barrel finish, return samples and report the methods and abrasives you need to improve quality and cut costs. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries

NORTON
ABRASIVES

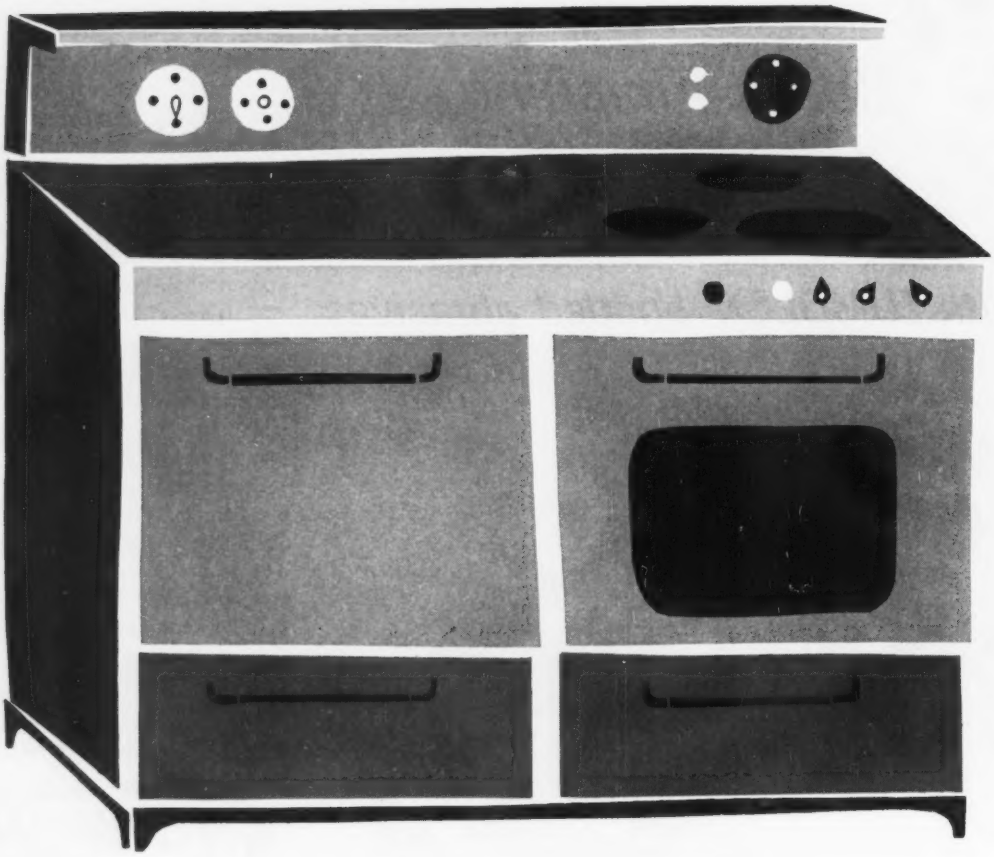
G-380

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

IF YOU'RE COOKING UP NEW WAYS TO SELL YOUR APPLIANCES, call on Brown-Lipe-Chapin right now! Let B-L-C engineers work with you at the design stage. We can help you add new sparkle to your product and help spark sales with Dura-Plate—the first major advance in chrome plating in the past twenty-five years. Also, under the same roof at Brown-Lipe-Chapin, you'll find mass-production facilities for quality, precision die casting and metal stamping. And for the finishing touch, there're facilities to anodize, polish and buff, electroplate and precision-paint any parts. Two plants, strategically located at Syracuse, New York and Elyria, Ohio, are ready to serve you with the same under-one-roof facilities. For further information, call or write Brown-Lipe-Chapin, Syracuse, New York.

BLC



GM GENERAL MOTORS

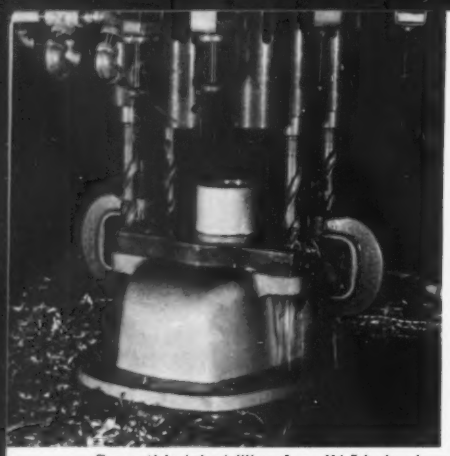
RELIABILITY by BROWN·LIPE·CHAPIN

DIVISION OF GENERAL MOTORS CORPORATION

"Our first Natco ran twelve years without an overhaul!"

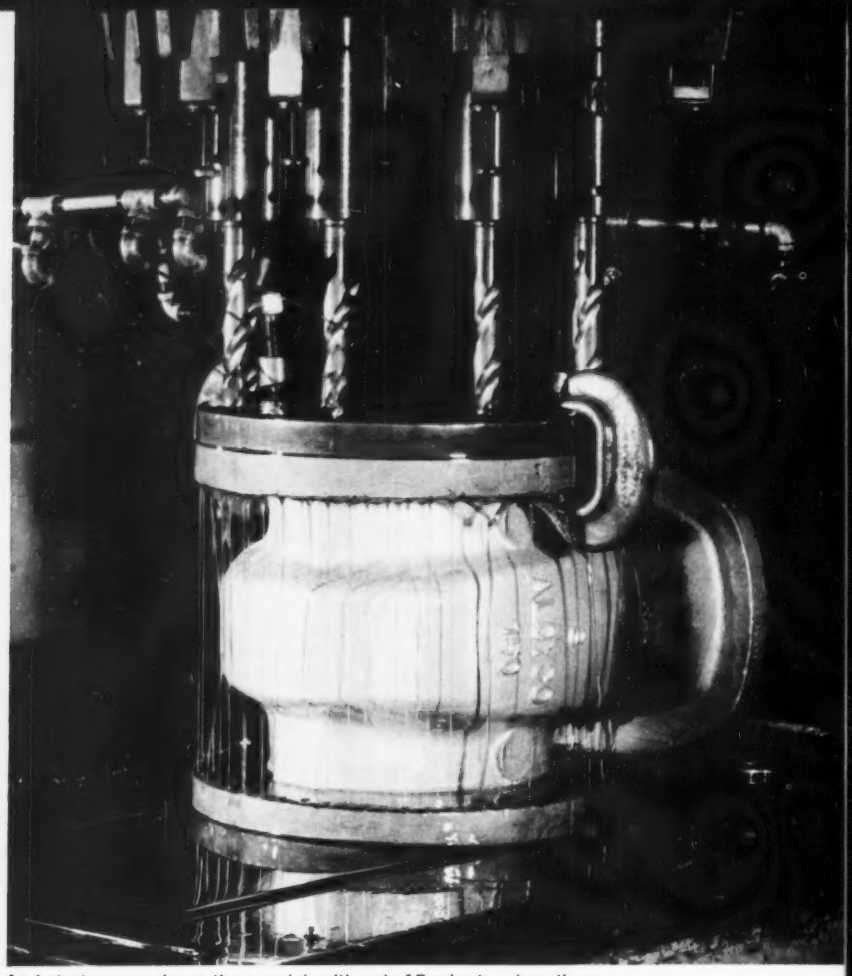
— says Harry L. Morley, plant manager of Alloy Steel Products Co.

(see other side)



From this job drilling four 11/16" holes in a stainless steel casting . . .

The operator changes the set-up to eight ⅞" drills in new locations . . .



And starts up again on the new job with only 15 minutes downtime.

"We can change set-ups in 15 minutes or less."

Now, five multiple-spindle Natcos keep production moving at Alloy Steel Products Company, Linden, N.J. Aloyco makes industrial stainless steel valves for the chemical, petrochemical, synthetic fiber, missile and atomic power industries.

Ideal for stainless—Aloyco's materials are hard-to-machine stainless and corrosion-resistant alloys. The steady hydraulic pressure of Natco machines keeps the tools moving into the work and gentles them through the critical break-through point. There's no ease-up to let work hardening start. Drill life stretches out.

Ideal for short runs— Aloyco's production runs aren't long, ranging from 10 to 400 pieces (100 pieces is average). With such short runs, fixtures have to be simple to pay off.

Ideal for cutting costs— An inexpensive guide plate is C-clamped on the face to be drilled and they see no need to fasten the part to the table. Natco C3Bs' accurate alignment, rigidity, lack of vibration and steady feed pressure frequently make permanent fixtures unnecessary.

With a single Natco multiple-spindle machine in your plant you add the productivity of a whole battery of specialized drilling, tapping, and boring machines. Call your Natco representative today.

NATCO

Multiple-spindle drilling, boring, facing and tapping machines.
Special machines for automatic production. Injection molding machines.

NATIONAL AUTOMATIC TOOL COMPANY, INC., RICHMOND, INDIANA

Nickel-Coated THOMAS STRIP Cuts Aladdin's Metal Costs 56%

Aladdin had his fabled magic lamp.

But in real life, Aladdin Manufacturing Company uses nickel-coated Thomas Strip steel to work production magic in its Minneapolis, Minn., plant.

From copper to aluminum to slit steel sheets to plain strip and finally—to cold-rolled strip steel pre-coated with nickel by Thomas Strip Division of Pittsburgh Steel Company.

That's the route followed by Aladdin's Merrill B. (Ted) Wilcox in his five-year effort to find just the right metal for use in his company's line of handsome, useful Jon-E Hand Warmers.

Thomas Strip Division has grown into Aladdin's major supplier of nickel-coated strip because:

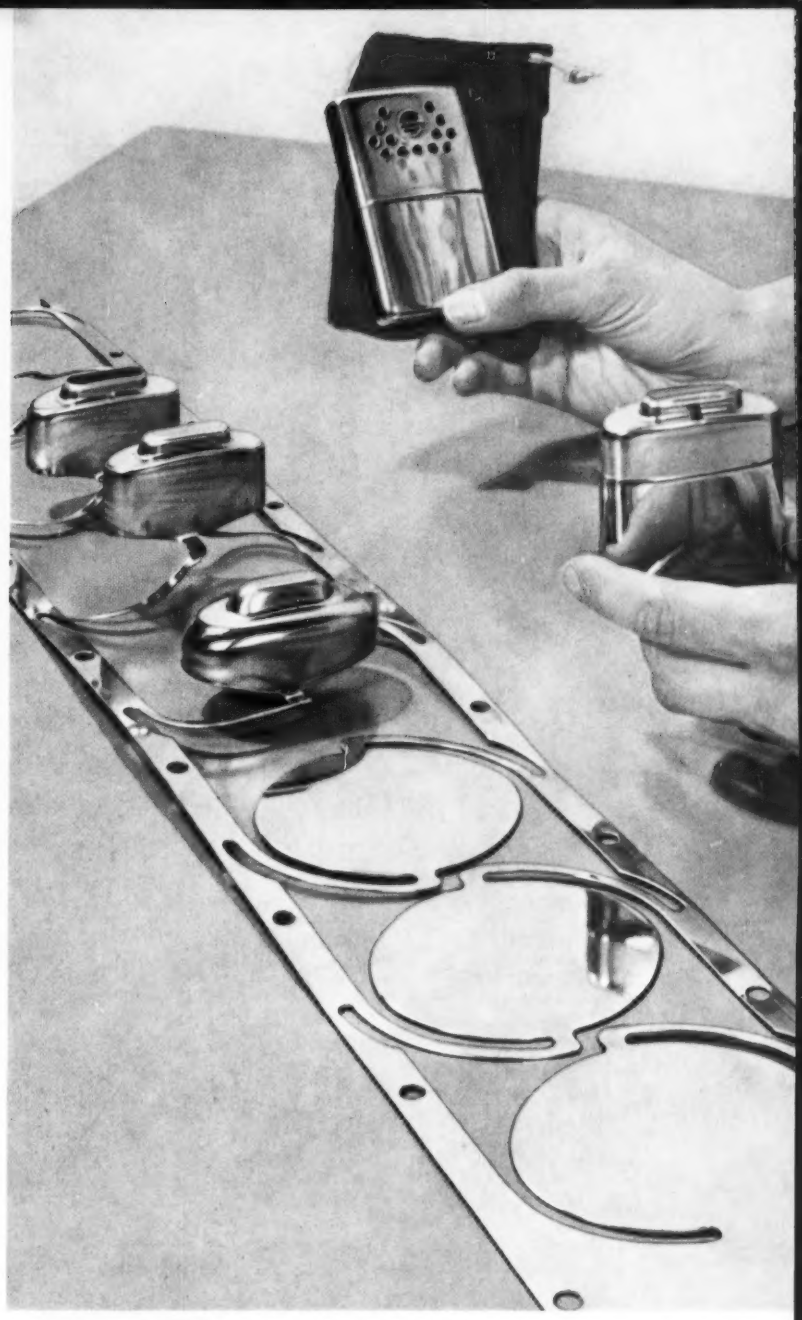
1. **Pre-coated nickel strip cut Aladdin's cost per pound of metal used from 50 cents for plain strip steel to 22 cents.**

2. **Use of nickel-coated strip enabled Aladdin to consolidate four separate production steps—each costing a cent—into a single step.**

3. **Pre-coated nickel cut scrap losses from a high of 20% (with slit sheets) to less than 1%.**

4. **Electrolytic coatings of nickel are more uniform, assuring the necessary snug fit of all Jon-E's components. And the only finishing Aladdin needs on nickel-coated strip is a quick ball-burnishing.**

All the production and design advantages of Thomas Strip are available to you. It is sold plain or electrolytically coated with copper, brass, nickel, chrome or zinc. Thomas also sells a full line of lacquered products. Call the nearest district sales office listed here. Do it today.



SIX-STAGE PROGRESSIVE die forms one Jon-E fuel chamber with every stroke of the press at Aladdin Manufacturing Company. This imposes severe demands on drawability of the 4½-inch nickel-coated steel strip supplied by Thomas Strip Division, Pittsburgh Steel Company. Aladdin credits Thomas Strip with 56% savings in metal costs, as well as sharply reduced scrap loss.

Thomas Strip® Division

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

IT PAYS TO STANDARDIZE ON **STANSCREW**

Stanscrew service helps insure precision of *Gilbarco* pumps

Gilbert & Barker Mfg. Company builds its famous Gilbarco gasoline pumps for oil companies large and small, and ships them to every state in the union as well as to most countries overseas. To insure precision and dependability of these pumps, great care must be taken in all assembly operations. Fasteners, for instance, must be torqued precisely to keep all components in perfect alignment.

Because of the critical importance of fasteners to its products, Gilbarco has selected Stanscrew heat-treated cap screws for such key applications as the positive displacement meter (shown in the insert). Stanscrew fastener specialists were happy to assist Gilbarco engineers in determining the right fastener with the correct torque to assure trouble-free service.

Gilbert & Barker is one of a long roster of honored names in American industry who have found it pays to standardize on Stanscrew. A product of unsurpassed quality . . . a broad selection of more than 5,500 different fasteners . . . prompt service through local distributors, backed by complete stocks at three conveniently located plants . . . these are a few of the reasons Stanscrew means greater value in fasteners.

Stanscrew's experienced fastener specialists can often suggest ways to improve your assembly procedures. Your local Stanscrew distributor will be happy to arrange a prompt visit. Call him today.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

here comes real detergency

Stuart's new Hi-D

transparent metalworking compound

Stuart

Hybrid compound keeps grinding wheels open and free-cutting, minimizes machine tool maintenance.

Now, today, there is a metalworking compound that offers extra-high detergency for stress-free grinding, yet does not attack paint, remove way lubricant, or leave crystalline deposits on the machine . . . that lubricates as it cleans, yet does not leave an oil film on the chuck . . . that is just as clear as any synthetic compound, yet is a petrochemical-type solution that is effective and stable at 60:1.

Hi-D is one of the outstanding lubrication developments in Stuart's 90-year history. Yet, it costs less per drum than most "coolants"—up to ⅓ less at proper dilution than some high-priced cutting fluids.

No other cutting and grinding compound is anything like it. Best described as a hybrid, it has all the qualities you look for in a synthetic without any of the disadvantages.

Who uses it? Turn the page and read results being obtained

Stuart

Productive Lubrication

FOR PROFIT-MINDED PRODUCTION MEN

VOL. 1, NO. 4 NOVEMBER-DECEMBER 1959

Stuart's **HI-D** checks rust, reduces costs at La Salle Steel

Stuart's new high-detergency, wide-purpose chemical compound—HI-D—proved to be just what the people at La Salle Steel Company wanted: a cutting fluid that works equally well for grinding or turning, and is capable of inhibiting rust at economically lean mixtures.

During its preliminary evaluation, Stuart's HI-D was put on two Medart turners. We're happy to report (having more than a passing interest in this product) that it made a versatile showing and was immediately put to work on 9 machines in the grinding and turning department. Jobs ranged from roughing cuts of 1/16" to 1/4" on the turners to lighter cuts for accuracy and fine finish on the grinding machines. Which brings up one of the ticklish problems at La Salle . . . in-plant protection for highly finished steel bar stock.

In testing other lubricants, La Salle found bars rusted too readily at dilutions of 30:1. But Stuart's HI-D worked efficiently at a 50:1 dilution while it held its high detergency and lubricity potency for efficient turning and grinding. La Salle maintained quality and at the same time reduced cutting fluid costs plenty (45%).

Stuart s HI-D can be used at 50:1 on machines like this centerless grinder as compared with 15:1 for the previous compound.

If you're looking for a cutting compound that combines high detergency, rust prevention, wide job range, high cooling capacity, and excellent lubricity, it will pay you to call in a Stuart representative. Our real objective is even more direct — buy a drum of Stuart's HI-D and test it on your problem jobs.

Phone your Stuart Representative listed at right.

Stuart

METALWORKING LUBRICANTS

D. A. STUART OIL CO., LIMITED

2727 South Troy Street, Chicago 23, Illinois

CANADIAN D. A. STUART OIL CO., LIMITED
P. O. Box 430, 43 Upton Road, Scarborough, Ontario, Canada

EUROPEAN OFFICE

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BLackburn 5-6926

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HEmlock 7-0151

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PArkway 1-3731

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PRospect 1-7411

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The Royal Supply Company
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JAckson 7-1144

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MElrose 2-2525

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Interstate Oil Co.
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DRexel 1-3470

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CApitol 8-7511

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Bay City Oil Co.
968 S. Bayshore Blvd.
Diamond 3-2090

SYRACUSE, New York
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404 N. Midler Avenue
Box 61, Eastwood Sta.
HOward 3-8647

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Canadian D. A. Stuart Oil Co., Ltd.
P. O. Box 430, 43 Upton Road
PLymouth 7-3227

EUROPE

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Effingerstrasse 75

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DENMARK, Copenhagen-Gentofte
Firma P. V. Nordentoft, Brogaardsvaenge 1

ENGLAND, London W. 1
Amber Oils, Ltd., 11A Albermarle St.

FRANCE, Paris 17e
Dasco S.A., 2, rue Gounod

GERMANY, Frankfort a.M.
D. A. Stuart Industrieoele G.m.b.H.
Cassellastrasse 31

ITALY, Milan
Univers S.p.A., Via Valvassori Peroni N. 47a

SWEDEN, Stockholm—Vartan
A. B. Gullander & Co., Postfack

SWITZERLAND, Bern
N. v. Muhlenen G.m.b.H., Schlosstrasse 131

Experience...
Gained through countless fastener problems solved over the past 52 years means a greater ability to solve each new problem more quickly ... more economically. We're proud of this accumulated "know-how" because it assures our customers of highest quality standard and special fasteners.
FERRY CAP
& SET SCREW COMPANY
2151 Scranton Road • Cleveland 13, Ohio
Cold upset screw products
...standards and specials.

Steel and aluminum users report increased values from Ryerson

These case histories—selected at random from our files, provide additional evidence that you consistently get increased value for your purchasing dollar from Ryerson. Individual points of difference between Ryerson and other sources may not by themselves seem overwhelming—but in total they add up to an important difference in dependability, experience and capacity to serve.

A world famous manufacturer formerly tested all steel purchased from steel-service centers for critical ordnance work. But, often, test costs on small lots of steel were greater than material costs. So the company decided to concentrate its purchases with sources proved completely reliable—and discontinue its own testing. Experience showed that the required certifications of quality were always absolutely dependable in the case of only three steel suppliers—among them Ryerson where quality has been a watchword since 1842.

Milling operation eliminated. A structural fabricator followed the usual practice of milling the ends of beams to be used as column bases until he discovered the accuracy and squareness of Ryerson friction sawing. Now he has eliminated the milling operation because, at no extra cost, Ryerson can guarantee friction saw accuracy of only ± 1/16" for beams up to 6" and ± 1/8" for sections over 6"—squareness tolerances of .010" per inch of section.

Better product appearance and a worthwhile saving in material cost resulted when a Ryerson man recommended that a producer of portable coolers switch from one aluminum alloy (3003-H14) to another (5005-H14). Slightly higher structural strength was a bonus value. Unusually broad aluminum stocks and technical resources often enable Ryerson to serve in this way.

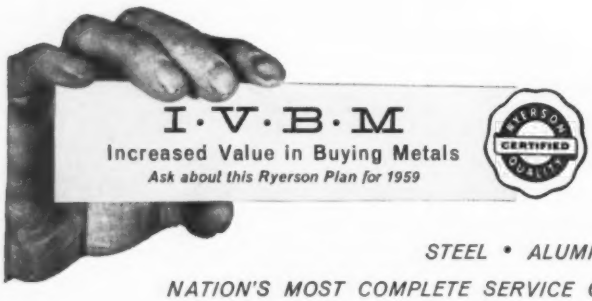
The need was urgent. A breakdown was cutting output of a big paint producer, and the steel needed to repair the break was not available in the area. However, the required analyses and size *was* on hand at the nearest Ryerson plant 200 miles away—and within an hour Ryerson delivered 100′ of this bar stock to the local airport. Three and a half hours after calling Ryerson in another state, the customer had his steel.

"Deeper cut, better finish, longer tool life, and lower total per-piece cost." These were the results reported by a Mass. machining company after it switched to Ryerson Rycut® 40 alloy steel for shafts, gears and spindles used in rugged machine tools. Ryerson Rycut steels are the world's fastest machining in their carbon ranges.

Missile component problem solved. Titanium stringers in stainless forged bars were creating a high reject rate for a missile parts manufacturer. His Ryerson specialist recommended a switch from Type 321 stainless to Type 347. Results: the same stabilized corrosion-resistance and strength—but no titanium stringers.

Furniture manufacturer saves 15¢ per unit on every chair produced. A *rolled* aluminum angle was being used where strength was not an important factor. A Ryerson aluminum specialist suggested an *extruded* angle which gave all the strength needed in the application, was more easily formed, had better appearance—and reduced costs as well.

These are just a few examples that illustrate the advantages that make Ryerson service truly unique. A call to your Ryerson representative may solve similar problems for you.



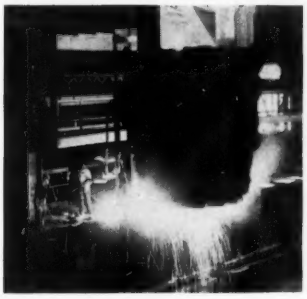
RYERSON STEEL®

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

NATION'S MOST COMPLETE SERVICE CENTERS IN PRINCIPAL CITIES COAST TO COAST

1960 Steel Output: 130 Million Tons if USW Stays on the Job



Look for 1960 steel output to surge to a record 130 million tons if the United Steelworkers don't walk off the job again. Even if they do, a record is possible. Warehouses and the auto industry will each take about 19 million net tons of steel next year; construction will require more than 13 million tons; the container industry will absorb about 9 million tons (Page 57).

Strike Forces Sharp Drop in World Steel Output

World steel production dropped to a rate of 317 million tons a year in the first nine months of '59—due to the U. S. strike. The '59 first half rate was 346 million tons. For the entire year, world output will far exceed the 289 million tons produced last year. But it's likely to fall short of the 316 million tons poured in 1957. This will probably be a record year for Canada, West Germany, France, the Benelux countries, Russia, and Japan (which has moved past France into fifth place among steelmaking countries), reports the Commerce Department. Russian production during the first nine months totaled 48,940,000 tons (vs. 44,983,000 tons last year).

Exit of Edsel: Does It Signify Big Reshuffle at Ford?

The auto industry predicted the demise of the Edsel more than a year ago. Now observers wonder if it might be part of a major reshuffle in the Ford empire (Page 75).

D&B Ranks Metalworking States

New York continues to lead the nation in number of metalworking plants (3502), says Dun & Bradstreet's new metalworking directory. California is second with 3294; Illinois is third with 3191. The next three are Ohio (2852), Michigan (2522), and Pennsylvania (2397). D&B counts 31,084 plants in the nation.

Warning: Importers Can Capture Markets Fast

The time to plan a countermove against competitive imports is before you begin losing sales to the foreign manufacturers. Once they get a foothold, they penetrate your market rapidly. Witness the case of the fastener industry. About 120 million lb of foreign fasteners will enter the U. S. this year. That's more than double the 1958 tonnage, four times the 1954 tonnage, and

30 times the 1951 tonnage. Says W. E. Ward of Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.: "Foreign competition is the most serious marketing problem facing us today. Even though current prices in our industry are about 6 per cent below last year's level, imports are underselling us by 20 to 30 per cent. It's impossible to reduce our costs enough to meet them. And with the advent of the St. Lawrence Seaway, I expect an ever increasing flood of imported products."

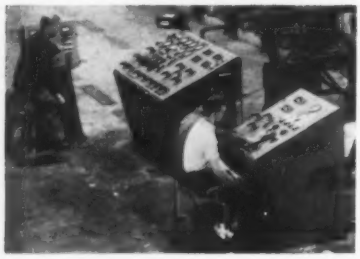
Standardization Offers You a Bountiful Payoff

Davenport Mfg. Co., Chicago, estimates that it saves $50 for every dollar it invests in standardization. The average company saves $6 for each dollar invested, finds a survey by American Standards Association. Conclusion: You're losing money if you don't check into the savings you can garner through standards activities (Page 62).

Government Files Suit in West Coast Antitrust Hassle

The Justice Department filed a civil antitrust complaint in the federal court at San Francisco last Monday charging six steel companies, 12 steel bar fabricators, and the Western Reinforcing Steel Fabricators Association with "conspiring to eliminate competition in the sale, distribution, and fabrication of rebars." Among the firms: U. S. Steel Corp., Southwest Steel Rolling Mills, Pacific States Steel Corp., Judson Steel Corp., Bethlehem Steel Co., Bethlehem Pacific Coast Steel Corp., Jos. T. Ryerson & Son Inc., Flintkote Co., Ceco Steel Products Corp., Pittsburgh-Des Moines Steel Co.

Planetary Hot Strip Mills Gain Popularity



High productivity for modest capital investments and minimum space requirements are causing steel industry equipment buyers to give planetary hot strip mills a thorough look. Four of the units are being operated in European and Canadian plants. Another is being built in Sweden (Page 104).

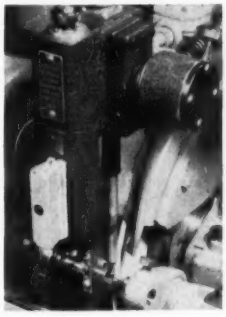
What Inflation Does to Equipment Costs

The need for putting a halt to inflation—and for revamping the nation's depreciation policies—is driven home dramatically by these figures: In 1940, you could buy a six spindle, automatic screw machine with a 1 in. bar capacity for about $8200. Today, the base price is $20,250. In 1940, you could purchase a box type atmosphere heat treating furnace for $3700; today it'll cost you $13,000. A mechanical press that sold for $3000 in 1940 costs $13,000 today. An open hearth shop that cost $10 million in 1930 will cost $64 million today. True, you're buying an improved product today, but the bulk of the rise can be laid at inflation's door.

Profile of the Man with No Job

Many of the nation's estimated 3.6 million jobless workers are in that classification only temporarily—as a result of the steel strike. The others fit this profile: Unskilled, young, nonwhite, living in an industrial city. After each postwar recession, the percentage of unemployed workers in the nation seems to level out at a higher figure. After the 1948-49 recession, the percentage was around 3.1 per cent; after the 1953-54 setback, it leveled off at around 4.3 per cent; now it seems to be settling near the 5 per cent mark.

New Machine Upgrades Jet Engine Parts



Makers of jet engine parts must meet tough customer specifications on short production runs. Machines they buy must offer precision and productivity. One plant found the answer in a machine on which a semiskilled operator can grind outside diameters to a tolerance of 10 millionths (Page 96). The machine derives ultrafine crossfeed from controlled distortion of the casting.

RCA Claims Replacement for Transistor

Radio Corp. of America says it has developed an electronic device that is smaller, uses less power, and operates at faster speeds than the transistor. It will be made available to equipment makers for experimentation. RCA thinks important uses will be found for it in missile control and guidance systems.

Upswing in Air Travel Opens Big Market to Metalworking

C. R. Smith, president, American Airlines (standing), and Thomas J. Watson Jr., president, International Business Machines Corp., get a demonstration of the jet age reservations system. Passengers on commercial airlines will double in the next five years. It means airlines will invest heavily in ground support equipment (Page 72).

1960 Will Be Booming Year for Bearingmakers

Shipments of bearings will climb $100 million (to $900 million) next year, predicts Richard S. Overton, director of marketing, SKF Industries Inc. He foresees a 20 per cent increase in sales to the aircraft and missile industry, a 15 per cent increase to these markets: Construction, mining, oil field, material handling, and electrical equipment.

Aluminum Usage Up 13 Per Cent in Autos

The average 1960 model car contains 13 per cent more aluminum than the average '59 model (56.2 lb vs. 49.6 lb), estimates Kaiser Aluminum & Chemi-

cal Corp. Five years ago, the average was about 25 lb; a decade ago, about 13 lb. The Corvair uses the most—102.6 lb. Lark uses the least—17.7 lb. Plymouth shows the biggest increase this year—31.3 per cent to 67.5 lb. Ford uses the most for trim—13.7 lb. "We believe aluminum bumpers, mufflers, and radiators will be ready for 1961 models," says a Kaiser spokesman.

More Small Companies Turn to Leasing

More than half the equipment leases being written are for firms with assets of $500,000 or less, reports Robert Sheridan, president, Nationwide Leasing Co., Chicago. Such firms now have about $65 million worth of production equipment on lease vs. about $21 million worth in 1957. Value of equipment now on lease: About $460 million.

Automatic Trains Are Feasible

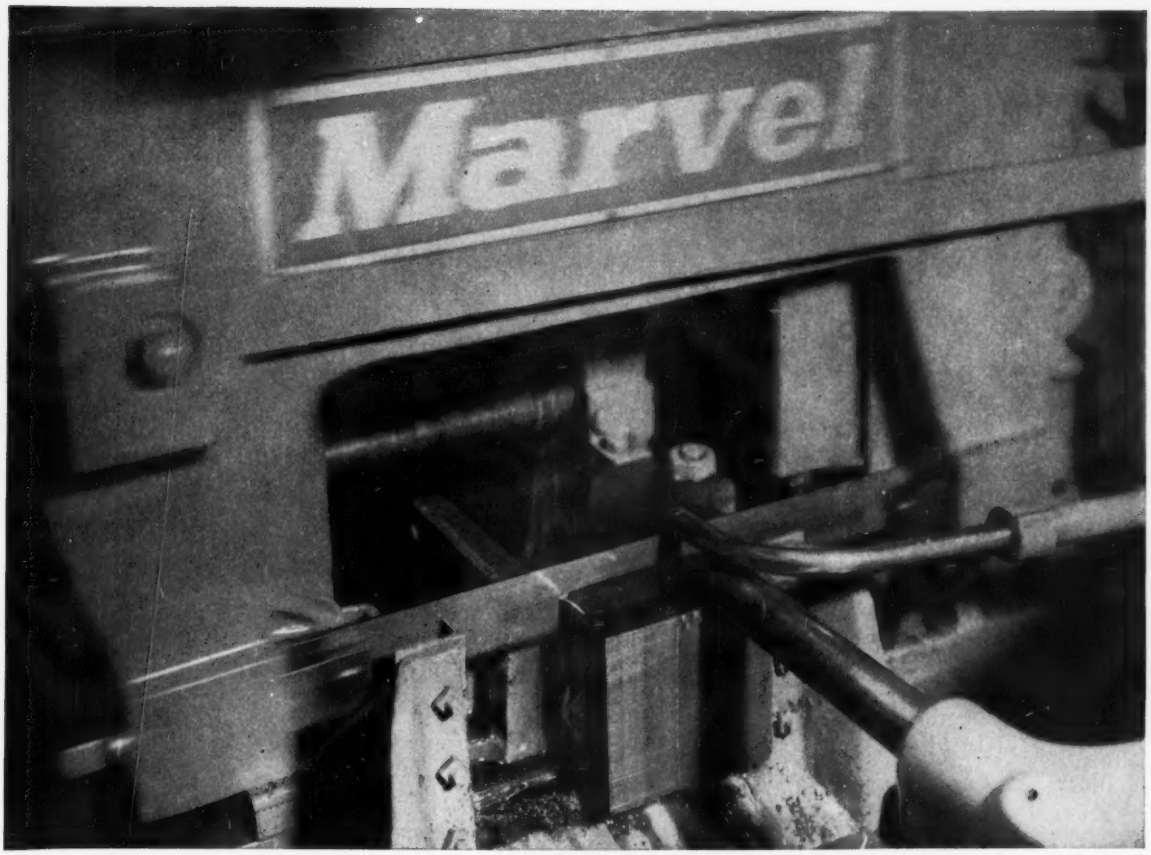
Completely automatic train operation (with no crew) is practical from an engineering viewpoint today, asserts W. A. Robison, design engineer, Union Switch & Signal Div., Westinghouse Air Brake Co. The control system would consist of electronic brains along railroad rights of way to make decisions on routing, starting, acceleration, deceleration, and stopping. A dispatcher would supervise train movements from a monitoring panel.

Boating Is Big Business

Retail sales of outboard motors, boats, and trailers this year will reach a record $465 million, predicts Guy W. Hughes, executive director, Outboard Boating Club of America. Motor sales (540,000 units) will total $255 million vs. $234 million last year (504,000 units). Boat sales will climb to $172 million (329,000 units) vs. $153 million in 1958 (316,000 units). Trailer volume will reach $38.5 million (175,000 units) vs. $32.8 million last year (168,000 units).

Straws in the Wind

An indication of the upswing in industry spending for research: Armour Research Foundation had a record volume of $15,431,000 in its latest fiscal year . . . USW members returned to their jobs at Union Carbide Corp.'s Sheffield, Ala., plant after getting a 9 cent an hour wage hike and more liberal fringe benefits . . . The cellophane industry will produce a record 455 million lb of film next year (vs. 435 million lb this year), predicts H. J. Michel, vice president, American Viscose Corp. . . . The Navy will award contracts worth $236 million for eight new vessels and one rebuilding job during the current fiscal year . . . Bell & Howell Co. and Consolidated Electrodynamics Corp. plan to merge . . . American Motors Corp. will add a third Rambler assembly line at its Kenosha, Wis., plant next year. Cost: $7 million . . . Jones & Laughlin Steel Corp. shipped an old rolling mill weighing more than 100 tons to a South American steelmaker last week . . . Westinghouse Electric Corp. will raise prices on power transformers by more than 10 per cent tomorrow (Dec. 1) . . . BDSA has extended the rules governing defense steel priorities to force steelmakers to give preference to top priority defense orders calling for delivery after Dec. 31 . . . General Motors will resume assembly of passenger cars at some plants on Dec. 7, at others on Dec. 14.



This is a MARVEL High-Speed-Edge Hack Saw Blade Cutting a 4" x 4" Titanium Billet

EVERYTHING'S IMPROVED BUT THE GUARANTEE

33 years ago, MARVEL introduced the first welded-edge hack saw blades . . . guaranteed them to be shatterproof . . . and a new concept of power hack sawing came into existence.

In combining, by welding, two materials—a narrow, high speed steel cutting edge, and a tough alloy steel body, MARVEL pioneered the modern hack saw blade.

When operators learned they could apply the heaviest feed pressures and highest speeds to the new MARVEL Blades with complete confidence that they would never shatter or "explode" to cause them personal injury, hack sawing began the approach to its present high level of efficiency. Even cutting "exotic" metals, such as titanium, where heavier feed pressures are a necessity, the MARVEL Blade does an outstanding job and is completely safe.

Today's MARVEL High-Speed-Edge Hack Saw Blades are greatly improved, even over the MARVEL Blades which were the best on the market a few years ago. Advanced metallurgy has produced better steels; new heat treating and manufacturing techniques have brought further improvements. The only thing unchanged is the Guarantee: THEY ARE SHATTERPROOF!

If you haven't used MARVEL High-Speed-Edge Hack Saw Blades recently, try them on your saws for a month and see the difference a truly superior blade can mean in higher speeds, greater accuracy, lower cost per cut, and guaranteed safety to operating personnel. Your nearby MARVEL Distributor carries a complete stock of MARVEL High-Speed-Edge Blades.

Write for Bulletin CT-175 which has complete details on MARVEL High-Speed-Edge Hack Saw Blades.

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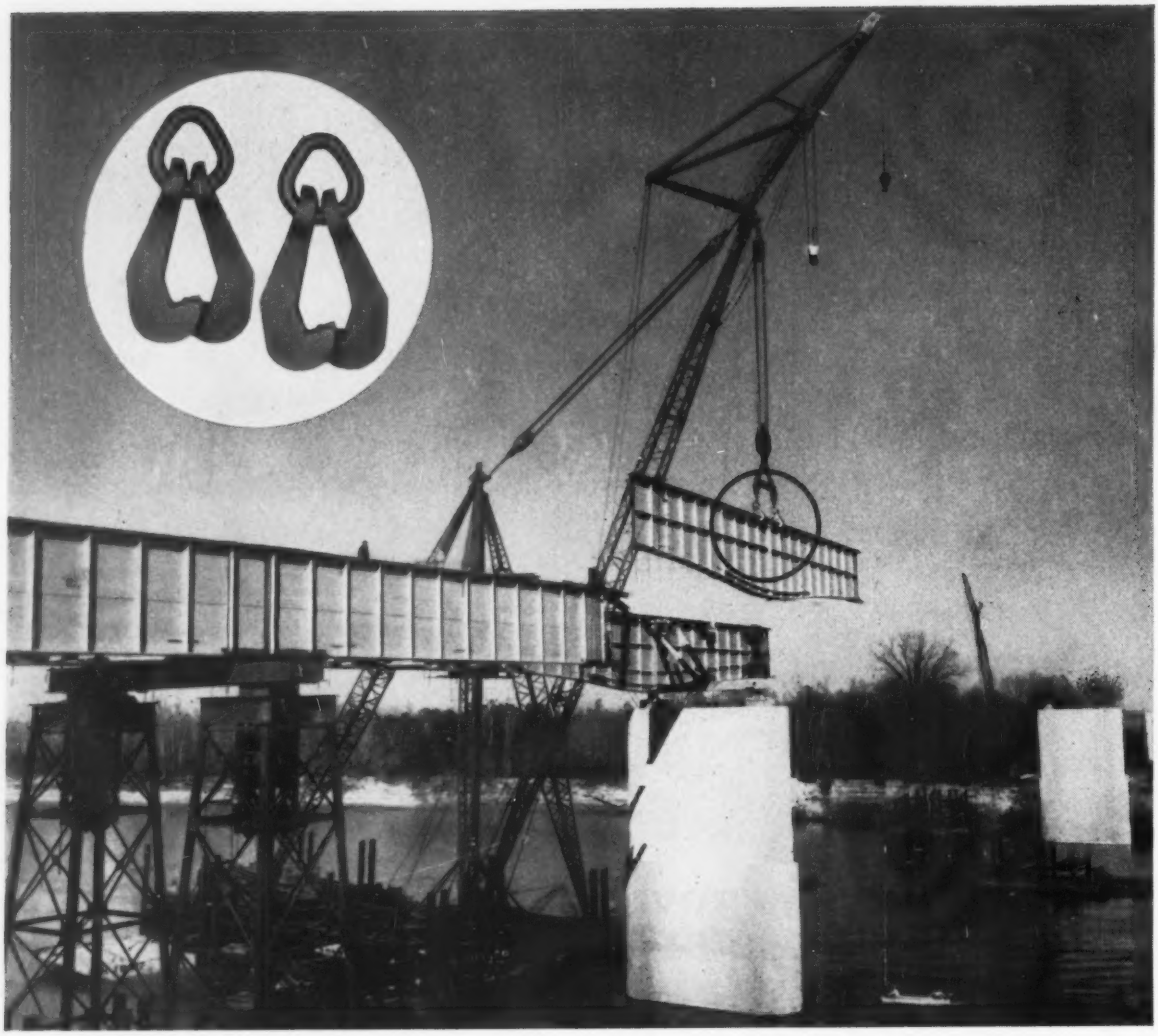
MARVEL Metal Cutting SAWS
Better Machines–Better Blades



BIG LIFT. Traveler derrick of John F. Beasley Construction Co., Dallas, Texas, erecting 125-ton girder assembly on Red River Bridge in Louisiana. The Missouri Steel Castings Company, Joplin, Mo., chose a nickel alloy cast steel for the girder dogs (circles) which take the brunt of the giant load.

2% nickel cast steel girder dogs say "Upsy Daisy" to 125-ton loads

A girder assembly that weighs 125 tons is more than most dogs can handle.

But here is a case where they get the needed extra strength — with a nickel-chromium-molybdenum alloy cast steel, normalized and tempered to meet ASTM Specification A-148-55T, Grade 105-85.

Containing 2% Nickel, this alloy cast steel has nominal properties on the order of 114,000 psi tensile strength, 89,000 psi yield strength and 21% elongation.

It's easy to see why nickel alloy cast steels have long and successful records on jobs where service conditions call for properties superior to those of carbon steel...

Among other advantages, nickel alloyed cast steels save weight without sacrifice of strength . . . provide hardness and wear resistance without brittleness . . . show excellent resistance to fatigue, and resistance to the effects of high or low temperatures. What's more, their characteristics of good fluidity and reliable response to heat treatment keep them popular with the foundryman.

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Tony on the Strike

Tony, my barber, owns his own shop. He employs three barbers. He is also secretary of the barbers' local. So Tony is a manager and a unionist.

Today he started talking about the steel strike.

"Those guys (union leaders) must be crazy. The workers don't want to strike. They don't particularly care about a couple of pennies in wages. They know that if they get more, prices of most everything will go up, and they can't buy any more than they can now. They're not stupid.

"Now all this talk about featherbedding, I don't understand. But it sounds all wrong. Everybody—you, me, all the people—ought to give a good day's work for a good day's pay. Goofing off is no good. But people don't understand this talk about work rules. I don't understand it. Lots of my customers don't understand it.

"I think the big boys (management) have done a lousy job explaining what all the fuss is about. They ought to do better. They're pretty smart. They got plenty of money. They ought to tell people just what the score is. They ought to tell the workers. They ought to tell the workers' women.

"I know how the union guys work. They talk. They get people excited. Sure, it's what you call emotional talk. Maybe it's not true, but it works.

"The big boys ought to tell us what they want in plain words we can understand. They ought to cut out the lawyer language, give us examples.

"Other big boys got the same problem. The railroads. The guys that build houses and things. One of my customers runs a big machine shop out east. He's got the same problem—workers goofing off, getting paid for not working. That's no good. Maybe he should tell people too.

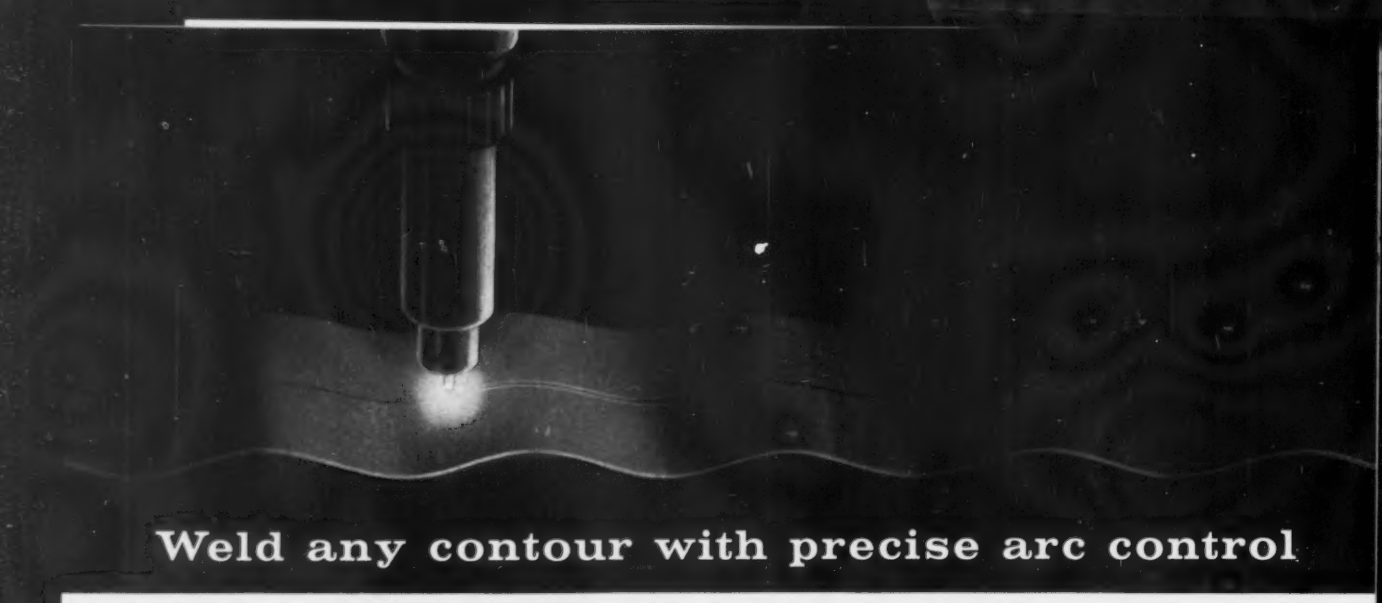
"But I tell you this, Mr. Campbell. If the strike starts up again in January, it's going to hurt all of us. Then the government will have to step in.

"I bet you neither the big boys nor the union guys like that, huh?"

Maybe Tony makes sense, huh?

Walter J Campbell

EDITOR



Weld any contour with precise arc control

...in hard-to-reach places

NEW Airco Automatic Heliweld Head

Get top quality welds every time – even on irregular contours or in restricted areas – with Airco's new *Automatic Heliweld Head.* With this new design, you're sure of precise arc length control over *all* surfaces . . . accurate, automatic welding in *all* positions . . . vibration- and wobble-free operation *all* the time. What's more, you can set it to weld aluminum (on AC) or ferrous materials (on DC)—at the flick of a switch. Sensitivity is maintained with argon or helium.

The new Airco Automatic Heliweld Head is right at home on the toughest jobs. Internal circumferential seams, for example, are handled easily with the 3″ or 12″ offset arms. Tilting mechanism provides accurate, controlled welding through 360°.

Take your choice of two models. Model E takes electrodes up to 24″. Model D takes electrodes to 7″, and is provided with rotatable offset arms of 3″ and 12″, greatly increasing your ability to weld hard-to-reach spots.

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Look for Record Ingot Output in '60

IF LABOR STRIFE is averted in January, the nation's steelmaking furnaces will pour a record 130 million net tons of ingots and steel for castings in 1960, averaging 88 per cent of capacity operations.

That's the consensus of experts whose estimates range from 120 million to 140 million tons.

Even at the bottom of that spread, the present record (117 million tons, set in 1955) will be substantially exceeded, while estimated 1959 production of around 92 million tons will be topped by 28 million tons, or more than 30 per cent.

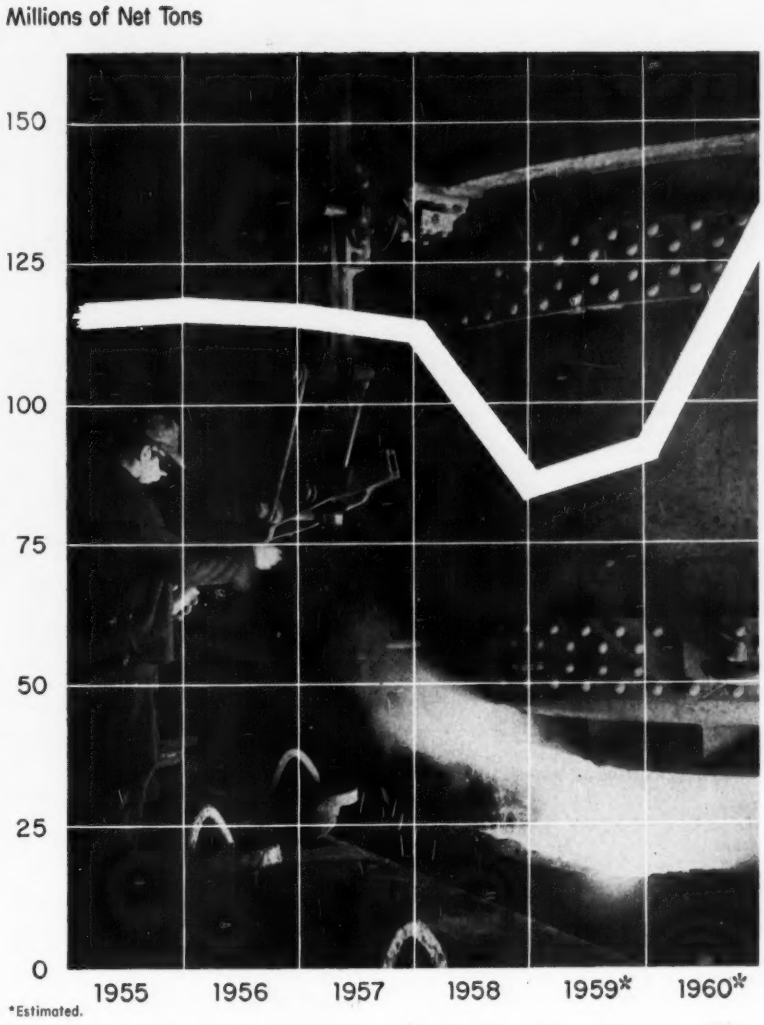
• Uncertainty over labor peace makes a prediction at this stage an iffy proposition.

Will a voluntary labor agreement be reached before the Taft-Hartley truce runs out? Will the workers accept the companies' last offer? Will Congress enact a law that'll keep the mills going while the labor issues are talked to a conclusion? Has the business boom been more than temporarily stymied by the steel shortage? Will general labor unrest slow down spending for consumer and capital goods?

With labor reservations, observers base predictions of around 130 million tons on: 1. Replenishment of strike-depleted inventories. 2. Heavy requirements for consumer and capital goods as the boom recovers from the strike-induced setback.

• Steel stocks now are down to an estimated 8 million tons, and are highly unbalanced.

They are not likely to change much for several months. They reached an all-time high of over 26 million tons at the start of the strike. Stocks ranged between 13 million and 16 million tons at the beginning of 1959. Next year, they should rise to about 22 million or 23 million.



Just what constitutes a "normal" stockpile is open to debate, volume depending on demand and adequacy of supply. Some experts cite 22 million tons as a comfortable inventory. That's equal to about 29.3 million ingot tons, and is over two and one-half months' production at the record monthly rate of 11.6 million tons established in May this year. With current needs pressing for tonnage, it'll take months for the pipelines to refill.

Steelmen point out, though, the rate of inventory replenishment will probably depend on the length of any new labor agreement that's negotiated. In event of a one year contract, users will rebuild stocks faster and more fully than they will if the wage pact runs two years or more.

Shrinking stockpiles usually reflect a policy change from accumu-

Estimated 1960 Steel Shipments To Leading Markets

(Based on percentage pattern of recent years)

Markets:	Net Tons	% of Total
Automotive	19,149,000*	19.64
Warehouses	19,032,000	19.52
Construction	13,650,000	14.00
Containers	8,989,500	9.22
Machinery	5,811,000	5.96
Contractors' products	5,031,000	5.16
Processing	4,485,000	4.60
Railroad	4,173,000	4.28
Electrical machinery	2,886,000	2.96
Other domestic equipment	2,652,000	2.72
Appliances	2,535,000	2.60
Agriculture	1,657,500	1.70
Fasteners	1,618,500	1.66
Nonclassified	1,365,000	1.40
Shipbuilding	1,150,500	1.18
Forgings (other than auto)	1,053,000	1.08
Oil & gas	805,000	0.84
Ordnance	565,500	0.58
Mining, lumbering, etc.	351,000	0.36
Aircraft	117,000	0.12
Total	97,076,500	

*Some authorities estimate 17.5 million tons.

lation to reduction. The early 1959 buildup, followed by the sharp contraction late in the year, however, was a departure from pattern.

• The buildup was sparked by strike hedge buying, the contraction by curtailed production in the face of heavy consumption.

Early this year, it was estimated steel was being stockpiled at a rate of almost 2 million tons monthly. It's not likely stocks will accumulate that fast in 1960 as manufacturing needs will absorb a larger share of output.

Inventory building assures an unusually strong steel buying movement next year. Coupled with heavy requirements for automobiles, consumer durables, construction, capital equipment, and in other large areas of use, 1960 is bound to be a big steel year. Gross national product—total output of goods and services—may average between $510 billion and $520 billion next year vs. $481 billion recently. (For a breakdown of estimated 1960 steel consumption in leading markets see the accompanying table.)

• Here's how things look in some of the important steel markets:

• Automobiles — Production between 6.5 million and 7 million cars. Truck output 1.3 million units. Steel use per car down to 1.75 tons from 1.82 tons due to the new compact cars.

• Construction — Commercial and industrial building will rise, but housing starts will be off due to tight money. Highway building may be down.

• Transportation Equipment — Freight car orders up to 60,000. They were 40,452 in the first three quarters of this year.

• Appliances—Demand will be above that in 1959, but housing sluggishness may hold volume down.

• Machinery—There will be sharp increases in nonelectrical machinery, reflecting capital investment, expected to range over $38 billion vs. $32 billion this year.

• Oil and Gas—About 53,000 wells will be drilled vs. 51,000 in 1959.

• Service Centers—Steel take may be up 50 per cent or more over 1959 because of inventory replenishment.

Canadian Mills Busy

Canadian steel users are placing heavy orders in their mills to restock. Quotas are being set for the first time.

Though shortages were not as serious as those in the U. S., a number of materials were in tight supply over the last several weeks. Most fabricators had enough stock to outlast the strike. But the end of the strike rescued steel users dependent on American production. Automotive industry was most severely hit because it depends on U. S. mills for body steel. A gray market was active in cold rolled and galvanized steel as American buyers competed for the available supply.

The back-to-work order in the U. S. will not affect the demand. The order books are well filled through March, 1960. U. S. recovery will only serve to put inventories in shape and relieve the pressure on Canadian mills.

Canadian steel prices remain below those of the U. S. An upward revision emanating from the strike or a boost in cost in Canada may bring an increase in some materials next year.

What Steel Companies Offer USW*

WAGES

Two wage rate increases ranging from 6 to 12 cents an hour depending on job classification, the first effective Oct. 1, 1960, and the second Oct. 1 1961.

Continuation of the 17 cents an hour cost-of-living adjustment resulting from the previous contract.

Provision for further cost-of-living adjustment up to 4 cents an hour in each of the second and third years of the new contract if living costs rise more than the minimum wage increase of 6 cents during the first or second year of the agreement under a formula based on the movement of the Consumer Price Index.

INSURANCE

The companies would pay the entire cost of life insurance and sickness and accident insurance heretofore paid jointly by the companies and employees. That includes life insurance after retirement.

The scale of life insurance for which the companies will assume the cost will be generally increased to provide insurance ranging from a minimum of $4000 up to $6500 for active employees.

The companies will pay for continuing life insurance for a maximum of six months in the event of a layoff, with coverage available for an additional 18 months at a cost of 60 cents a month per $1000 to the employee. The sickness and accident benefits for which the companies would also assume the cost, would be increased to a new scale of $53 to $68 a week. Employees with two years or more of service could continue coverage for the first six months of layoff under the existing hospital and surgical insurance program which would remain on a contributory basis.

EMPLOYEE SECURITY

Increase company cash payments into the Supplemental Unemployment Benefits fund from the previous level of 3 cents an hour to 5 cents. Agree with the union to protect employees' seniority rights for a maximum of five years against a break in service in the event of layoff or physical disability, or both.

PENSIONS

Increase pensions for employees retiring after Jan. 1, 1960. Thus, those retiring after next Jan. 1, with 35 years' service, will receive increases ranging from $5 to more than $12 a month.

Provide full pensions for employees with at least 25 years' service, retiring after Jan. 1, 1960, at or after age 55 by reason of a break in service resulting from permanent shutdown, extended layoff, or sickness. An employee thus affected can retire at the full pension to which his age and length of service entitle him.

Permit, under mutually satisfactory conditions, early retirement at full pension at age 60 for employees with 15 years or more of service.

Increase the minimum disability pension from $90 to $100 a month for employees retiring after next Jan. 1. Provide conversion rights on hospital and surgical insurance at retirement, with payment to be deducted from pension checks if desired.

Total Cost: 38 cents, including maximum escalator boost.

WORK RULES

A committee of two men, one designated by the companies and one by the union, should determine what, if any, changes should be made in the local working condition provisions. If the two can't agree by June 30, 1960, the questions should be submitted to binding arbitration by a board whose membership shall include one chosen by the companies, one by labor, and one picked by the first two. The board shall give its decision within 90 days after June 30, 1960.

HUMAN RELATIONS

A Human Relations Research Committee would be established to study and recommend solution of problems in employment stabilization, wage incentives, seniority and other problems.

*As of Nov. 15.

LOOK FOR at least one more offer from the steel companies before steelworkers start voting Jan. 6.

If the steel case isn't settled by then, the union members will ballot on whether to accept the companies' last offer or go back on strike.

• **Fast Veto**—The industry's offer of Nov. 15 (see the accompanying description) was quickly spurned by the union. But some observers profess to see faint cause for optimism in the fact that United Steelworker President David J. McDonald did not call the union's Wage Policy Committee to vote on it. Therefore, the reasoning goes, the veto wasn't as final as others have been.

But Mr. McDonald says he didn't call the committee because the Nov. 15 offer was almost the same as the Oct. 17 proposal which the group had vetoed.

• **Two Big Changes**—Yet the latest company move shows two interesting shifts from the month-earlier offer. The first is the submission of the work rules question to study by a union-management committee. If the two-man committee can't come up with anything by June 30, 1960, the issue goes to binding arbitration.

A second important concession permits a maximum cost-of-living adjustment of 4 cents in the second and 4 cents in the third year of the contract. The month-earlier maximum was 3.6 cents for the life of the agreement. Also improved were pension and insurance proposals.

• **Work Rules Fight**—On economic

matters, the two sides aren't too far apart. On work rules, they are miles from agreement. Last week, many labor observers were gloomy about chances for settlement before Jan. 6. Nor were they any too optimistic about whether the union members would repudiate their leadership by voting to accept the last offer—even in a secret election.

The chief factor favoring a settlement is the fear by both sides of what Congress will do to prevent big strikes from recurring. Congress convenes just as the steelworkers are scheduled to vote.

• **Quiet Pressure**—Government officials, chiefly Labor Secretary James Mitchell, are playing heavily on the legislative possibilities as they try to get each side to give a little. Speculation that Congress may attempt to force a settlement by compulsory arbitration is mounting.

In the meantime, you can expect resumption of meetings between the two sides. The worst of the start-up problems that took much management and union time are over as operations climbed to 88 per cent of capacity last week.

• **Little Consumer Pressure** — Although steel users are still hurting for the metal, the pinch will get no worse (unless the strike resumes). Steel or no steel, nine of ten consumers tell STEEL they support the industry's labor stand. In the past, management has often signed because of the pressure from customers. Not so this time. The large majority echo this comment from Glen Carlson Sr., president of Acme Mfg. Co., Detroit: "We have to hold the line on increases now. The steel industry will never have a better chance."

GM's Euclid Opens Plant

Crawler tractors are being produced in a new, multimillion plant at Hudson, Ohio, by Euclid Div., General Motors Corp. Under construction are a parts office and warehouse which will consolidate the division's service parts activities. Euclid also announced the introduction of its C-6 crawler tractor. The firm's other tractor—the TC-12—will also be made at Hudson.

Behind the sign, a struggle for management rights at . . .

Kohler: Now a Symbol?

THE STEEL INDUSTRY'S battle with the United Steelworkers has all but eclipsed the six year old management-union contest between Kohler Co., Kohler, Wis., and the United Auto Workers.

To many observers, the Kohler stand signaled the need for management to gain back some of the rights to manage that it has bargained away to the union.

To Herbert V. Kohler, president, basic issues involving the free enterprise system are at stake: Compulsory unionism, discounting of the individual's merit, joint company-union management, pattern settlements, inflation through granting wage increases not justified by productivity increases.

Says the UAW: Kohler still has to catch up with accepted union contracts: "Wages on an hourly basis are lower than the company's industry average; seniority doesn't count; there's no arbitration procedure on disciplinary action or discharges; and no union shop."

Wages, it adds, are 40 to 50 cents an hour below the plumbing industry average. The company denies this and says its wages are comparable.

• **Status Quo**—The issues today are basically the same as the day the strike began, Apr. 5, 1954. Picketing and violence marked the early months. Production was halted for 54 days. As work resumed, the battle between Kohler and union continued in the courts, before the

National Labor Relations Board, and in Congressional committees.

Next step in the battle will come with an NLRB decision which is due sometime next spring. The board will rule on union charges that Kohler failed to bargain in good faith and committed unfair labor practices.

Regardless of how that body rules, appeals from one or both sides will follow. The case then will go on to the U. S. Circuit Court of Appeals and could end up in the U. S. Supreme Court. One phase of the battle, an action testing the right of the Wisconsin Employment Relations Board to order the halt of mass picketing, has already been ruled on by the high court (in favor of the WERB).

Time is working against the union. One of the original demands of the union was reinstatement of 90 employees that had been fired (including union officers and chief stewards). An early NLRB decision for the union might have forced Kohler to take many of them back. Now, some of those men have died and others have found jobs elsewhere.

One action has come out of the NLRB, but it did little to settle the strike issues. On Oct. 10, 1957, a board trial examiner, George A. Downing, found the company had committed unfair labor practices and recommended reinstatement of nearly all strikers whose jobs had not been filled before June 1, 1954.

Result of the examiner's findings: Both the company and the union filed exceptions and the Kohler strike was no nearer to being settled than it was in 1954.

• **Not Hurt, Says Firm** — In the meantime, what effect has the strike had on the company? One of the means used by the union to bring economic pressure on the firm was a boycott of Kohler fixtures. This is what Mr. Kohler says about the boycott: "It has not hurt us. The sales we may have lost have been more than offset by the sales we have gained. Many people are buying goods because they are sympathetic to the company's fight. Others just don't like being told not to buy the products."

• **Fewer Employees**—The original bargaining unit of production workers at Kohler numbered 3300. Today, the company has fewer employees (union officials place production workers at about 2500).

In the last five years, Kohler Co. has put up a new plant in Spartanburg, S. C., to manufacture vitreous china plumbing fixtures.

The company says it re-employed all of the original strikers who wanted to come back to work except the 90 it fired and a few others who committed serious misconduct during the strike.

• **Long Wait**—Back in June, 1955, Kohler Co. stated that it no longer recognized the UAW as the bargaining agent for the employees and challenged its majority status. An election to settle that issue cannot be held until the NLRB has ruled on the union's charge that the company failed to bargain in good faith.

So the Kohler strike is seemingly at a stalemate. Many prominent people have tried to help settle the strike, including Walter J. Kohler, ex-governor of Wisconsin; Senators Irving M. Ives (R., N. Y.) and Mathew M. Neely (D., W. Va.), Secretary of Labor James P. Mitchell, a Wisconsin circuit judge, the Federal Mediation & Conciliation Service, and three clergymen. Their efforts got them nowhere.

GRINDING MACHINE of the completely enclosed type turns out beryllium bolts in the new exotic metal laboratory at Standard Pressed Steel Co., Jenkintown, Pa. The bolts are used for missiles and satellites because of their great weight saving potential

New Engine Boasts Only 2 Moving Parts

CURTISS-WRIGHT CORP. has introduced a new engine described as a "rotating combustion engine, combining the best features of the reciprocating piston engine and the gas turbine or jet engine."

The powerplant, says Roy T. Hurley, Curtiss-Wright's chairman and president, was developed jointly by his firm and NSU Werke of West Germany.

Claims Curtiss-Wright: The new unit is smaller, lighter and cheaper than a comparable reciprocating piston engine. It has higher efficiency and fuel economy than a jet engine and has only two moving parts—the rotor and crankshaft. There are no valves, springs, camshafts, or connecting rods.

Models ranging from 100 to 700 hp will be in production next year for use in cars, boats, planes, and in industry, the firm announces. Plans call for models in the 5 to 100 hp and the 750 to 5000 hp ranges.

• **Priced Low**—Because of the engine's simplicity and the absence of exotic materials for exhaust valves or turbine blades, the price will be low, officials promise. They report that the motor requires less than 0.45 lb of gasoline for each horsepower hour.

Starting Salaries Rise

Engineers are back in demand, claims University of Michigan's Placement Service.

Prof. John Young, head of the service, predicts salary offers to 1960 graduates will be up 5 per cent. Last year's average starting salaries were: Bachelor degrees, $508; master, $598; doctor, $821.

Research and development is taking the biggest share of the graduates. This year 47 per cent of the positions accepted by UM engineering grads were in R&D. Another 27 per cent went into design, and 10 per cent into training programs. The remainder chose jobs in operations, sales, or teaching.

Job offers at UM this year were up 87 per cent over those in 1958, Professor Young reports.

Standardization Pays Off BIG

You can expect to save about $6 for every $1 you invest in standardization. That's what the American Standards Association concludes from a survey of companies using the approach. Here are examples of results . . .

Company & location	SPENT on standardization	SAVED via standardization	SAVINGS per $1 spent
Utility Appliance Co., Los Angeles	$13,040	$50,000	$ 3.85
Davenport Mfg. Co., Chicago	500	25,000	50.00
Lamson & Sessions Co., Cleveland	61,400	1,000,000	16.29
Servomechanisms Inc., Hawthorne, Calif.			1.50
Lincoln Engineering Co., St. Louis			3.50
E. W. Bliss & Co., Canton, Ohio	14,000	50,000	3.57
R. Hoe & Co., New York	25,000	50,000	2.00
Pope Machinery Corp., Haverhill, Mass.	5,000	50,000	10.00
Pitney-Bowes Inc., Stamford, Conn.	18,735	50,000	2.67
St. Regis Paper Co., East Providence, R. I.	30,000	107,000	3.57
Dixon Sintaloy Inc., Stamford, Conn.	15,000	60,000	4.00

Source: American Standards Association survey.

HOW MUCH would you invest in a program that promised to add 1 per cent to your profit margin?

Chances are you can buy such a program for one-sixth the amount of money it will save you. The profit boosting activity: Standardization.

Your payoff may be even greater. One company reports saving $50 for every $1 it invests in the project (see table). A survey by the American Standards Association finds that companies save from 0.3 to 5 per cent of their sales dollars through standardization activities. The average is 1 per cent.

Important intangible savings can be garnered too. Reports a machinery manufacturer: "One cannot measure in dollars the countless petty arguments, needless conferences, and time-consuming searches that are eliminated through standardization. The standards manual cannot be surpassed as an effective training device. And standards have an important direct effect on reduction of scrap and consistent product quality." The machinery maker has developed standards for materials (metals and nonmetals alike), heat treating and other processes, welding, keyways, surface finishes, sprocket tolerances, gears, hardware of all kinds, and drafting and design practices.

Kentucky Utilities Co., Lexington, Ky., reports that adoption of a new standards program permitted it to: 1. Reduce number of purchase orders. 2. Trim inventories. 3. Simplify construction practices. 4. Define and enforce safety procedures. 5. Simplify stores accounting and material handling.

• **Let's Talk Cases**—An electronics manufacturer reports these specific cases of dollars saved through standardization: 1. Replacing ten grades of wire with four grades, $40,000 annually. 2. Purchasing flat copper strip to flat wire specifications, $13,000 annually. 3. Standardizing on flat machine screw nuts, $5000 annually. The firm trimmed 53 items from its stock lists in a single year.

Warner & Swasey Co., Cleveland, set up standards to eliminate special length screws, slashing the cost of special runs to make them. And by applying standard radiuses on drawings, the company no longer has to stock many tools of different radiuses.

Van Norman Machine Co., Springfield, Mass., developed a standard for wall thickness and inside and outside diameter tolerances on bushings to carve 40 per cent from its bushing inventory.

St. Regis Paper Co., East Providence, R. I., slashed inventory $1.2 million in three years through a new standards program. It also credits standardization for a 22 per cent increase in production with 41 per cent fewer manhours.

Wheeling Steel Corp., Wheeling, W. Va., reduced wrapping costs through standardizing on types of wrapping paper.

• **Organizing the Activity** — ASA queried 2800 companies, got 238 returns. Of those, 36 per cent reported having formal standardization programs. Another 63 per cent said standards were handled as part of another function—usually engineering, purchasing, or design. Standards activity is centralized in 100 of the 238 companies; plants and divisions handle their own programs in 57 firms.

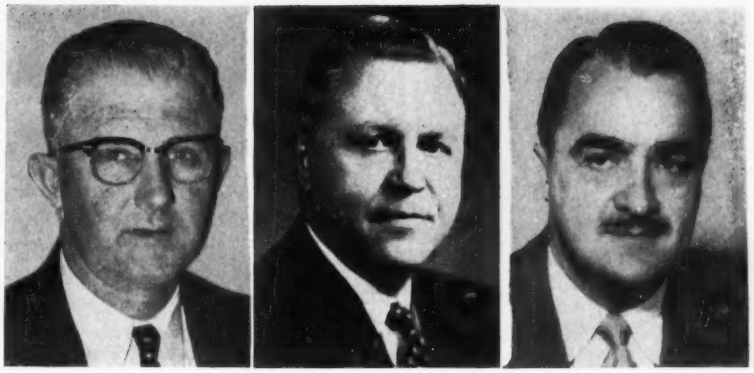
Here's who the man in charge of standards reports to: The president in 11 per cent of the companies; the vice president-engineering in 31 per cent; the executive vice president in 27 per cent; the vice president-manufacturing in 7 per cent; the vice president-research and development in 4 per cent; and engineering manager in 12 per cent; a plant or division manager in 8 per cent.

• **Financing It**—Only 68 of the 238 companies surveyed reported special budgets for standards work. In most cases, the cost is buried in the engineering budget. In a few instances, it's included in operating or purchasing budgets.

The biggest cost factor in your standards budget will be manpower; it'll probably account for 50 to 85 per cent of the total. Travel and attendance at standards conferences will probably take 10 per cent. Office space, printing, stationery, and the like will take 5 to 20 per cent. Membership fees in organizations that develop standards can account for less than 1 per cent or more than 15 per cent. And you might spend $500 a year or so to buy printed standards from associations. Of the 238 respondents to the ASA survey, 166 reported affiliation with at least one association writing standards.

• **More Effort Needed**—More and more companies are realizing the cost cutting potential of organized standards programs. But many virgin areas remain to be explored. The potential is great: ASA estimates that the nation could save $4 billion annually if standards programs were widely developed and applied.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



Messrs. Mattison, Hicks, and Trecker take the reins as . . .

Machine Tool Makers Fight For Share of World Market

IN THE LAST seven years, exports of many standard machine types by American builders have slumped by about 50 per cent.

ALTHOUGH U. S. builders are still in the driver's seat in the domestic market, foreign built machines are getting about 6 per cent of the total vs. 1 or 2 per cent in 1951.

THIS YEAR, the Russians will turn out about 146,000 metal cutting machine tools (U. S. will make about 33,000), and the Reds are being eyed as a formidable world competitor.

Those facts summarize the challenge that faces the leadership of the National Machine Tool Builders' Association. Its goal in 1960: Capture a bigger share of a booming world market for capital equipment.

At its annual meeting, NMTBA elected these men to leadership: Alan C. Mattison, president, Mattison Machine Works, Rockford, Ill., (left) is the incoming association president. Everett M. Hicks, vice president and general manager, Grinding Machine Div., Norton Co., Worcester, Mass., is the new first vice president (center). Francis J. Trecker, president of Kearney & Trecker Corp., Milwaukee, is the second vice president.

• **Capacity Shift**—The migration of U. S. builders' capacity to foreign countries is well underway. Outgoing President Ralph J. Kraut, president, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., cites an association survey which reveals that 31 per cent of the participating builders have foreign capacity; 16 per cent more have plans underway to manufacture abroad. Mr. Kraut estimates that the builders with capacity overseas represent more than 75 per cent of our domestic capacity.

Machine tool builders are going abroad because of low manufacturing costs (averaging perhaps 40 per cent under domestic costs), tax breaks, tariff advantages, and proximity to foreign customers.

What about shipping machines back into the U. S. to take advantage of foreign building costs?

It's simply a matter of economics, say the builders. So far, their foreign built machines are finding buyers abroad. Further, Walter Bailey, president, Warner & Swasey Co., Cleveland, points out that shipment of machines back into this country will affect the economics of home plants. Still, when it makes economic sense from a corporate standpoint, many builders admit they will ship machines back.

New England Fights

CONNECTICUT . . .

Gross state product increased from $4.8 billion in 1950 to $8 billion in 1958. Major growth has been in transportation equipment, instruments, machinery, aircraft, and missiles. Over 1200 new manufacturing plants have been added. Metalworking employment: 285,000 vs. 239,000 in 1950.

MAINE . . .

Manufactured product value has increased 41.6 per cent since 1950. Durable goods employment (about 30,000) is down, although electronics, aircraft, and missile makers have moved into the state recently. The tax situation is favorable: No personal, corporate income, or excise tax.

MASSACHUSETTS . . .

Boston areas have experienced one of the biggest electronic booms in the country—82,300 are employed. Durable goods employment rose from 266,900 to 303,300 between 1947 and 1957. Yet the exodus of industry has been the greatest in the New England group. State planners consider next year as crucial period to check the migration.

NEW ENGLAND is waging an uphill battle to lure more industry into the area. The campaign is two pronged: 1. To help ease unemployment caused by the drop in nondurable goods industries (300,000 jobs have been lost in textiles alone since 1919, says the Federal Reserve Bank of Boston). 2. To take care of the expanding work force (population rose from 9.3 million in 1950 to 10.1 million this year).

• **More Durables** — Nondurables continue to decline, while the value of durable goods to the area's economy has increased 10 per cent over the last decade. The number of New England metalworking plants is estimated to have tripled since 1939, and value added by manufacture has increased even more. Durable goods employment rose from 624,000 to 716,600 in the last decade. The value of durable goods went from $2.8 billion in 1947 to $5.6 billion in 1957.

Growth remains shaky. Heavy gains have been made in: 1. Electrical goods (New England's electronic output this year should hit $1.25 billion, one-seventh of the U. S. total). 2. Missile and aircraft hardware (the area has one-fifth of the nation's missile program, one-eighth of aircraft parts). But such progress has been partially offset by the departure of durable goods manufacturers for greener pastures. Such companies as Sylvania, Raytheon, Avco, and United Aircraft have poured large sums into New England expansion in recent years.

Most commonly voiced complaints: High state, local, and property taxes (Connecticut, Massachusetts, and Rhode Island are among the highest in the country); high social welfare costs (particularly workmen's compensation); and many companies' geographical market centers are too remote.

• **Plusses**—One reason for the fast growth in electronics and missilework is the area's abundance of highly skilled workers, a legacy from the textile industry and New England's traditional dependence on manufacturing. Another equally important reason: New England has about one-sixth of the nation's research facilities. Schools train about 1 of every 7 U. S. scientists, and the heavy concentration of universities guarantees easy access to a large number of technical experts.

• **In a Nutshell**—Here is a capsulized rundown on New England's present strengths and weaknesses:

• Per capita income is high. Connecticut ranks first ($2817) in the country, says the National Industrial Conference Board. Massachusetts is eighth. The other four states range from 20th to 35th.

• About 90 per cent of U. S. sporting firearms and ammunition (grossing $90 million a year) are made in New England.

• The area's machine tool builders account for about 28 per cent of the nation's annual output.

• The six states produce around 47 per cent of the textile machinery, 52 per cent of the cutlery, 29 per cent of ball and roller bearings, and 49 per cent of nails and spikes.

• Nonferrous growth has slowed up. Much of the recent expansion put in by area-headquartered brass and wire cable mills has been in other parts of the country. Yet 33 per cent of the copper rolling and drawing and 30 per cent of insulated wire and cable production are still centered there.

• New England continues to dominate in the manufacture of silverware, having 85 per cent of the

for More Industry

NEW HAMPSHIRE . . .

Manufacturing employment has remained fairly constant over the last decade. Machinery industry is the largest durable goods employer, but growth of the electrical industry has been the most rapid.

RHODE ISLAND . . .

Total nonfarm employment is down about 11,000 from 1950 due to the loss of textile mills. But durable goods employment is up 5.7 per cent to 38,330. Value of durable goods is about $450 million a year, 30 per cent over the 1950 figure. State planners predict 25,000 new jobs in next ten years in electronics, instruments, and special machinery.

VERMONT . . .

Little change in employment in last decade—about 36,000 for all manufacturing. Machine tools is the most important metalworking industry. Tax situation is favorable. Modest industrial growth expected.

sterling and 75 per cent of the plated ware. Value: $150 million annually.

• In plastics, New England has about 30,000 employees in 600 plants compared with the national total of 190,000 workers in about 5500 plants.

• Expenditures on plants and equipment among New England's durable goods manufacturers hit $400 million in 1957, fell off to a little over $300 million last year, and will probably drop to about $200 million in 1959, estimates the council.

How Companies Rate New England

PROS . . .

- **Good supply of highly skilled workers.**
- **Excellent research facilities at universities and private laboratories.**
- **Fine educational institutions that can be tapped for scientific, business, and liberal arts graduates . . . and offer opportunities for employees to do postgraduate work.**
- **Good cultural climate.**
- **Pleasant area in which to bring up a family.**

CONS . . .

- **Heavy taxes in the high industrialized states.**
- **Heavy social welfare costs in some states, complicated by poor money management, fiscal troubles.**
- **Long history of heavy unionization, some archaic labor laws.**
- **Bad geographical position from the standpoint of national metalworking markets.**

Seaway's Traffic Hits 20 Million Tons

ABOUT 20 MILLION TONS of cargo moved through the St. Lawrence Seaway by the close of the shipping season on Nov. 30.

Lewis G. Castle, administrator of the St. Lawrence Seaway Development Corp., said reports that the Seaway was falling 40 per cent behind estimates were "entirely false." At the same time, he denied that tolls would be lowered next year.

He said that under international agreement with Canada, the tolls were set for five years, but the agreement also provided for review of the charges at the end of that time.

In 1957-58, the projected figure for tonnage was put at 25 million. Mr. Castle said 1968 tonnage could reach 60 million but noted that it would depend on development of Great Lakes ports to handle general cargo.

New U.S. Steel Mill To Roll 210 in. Plates

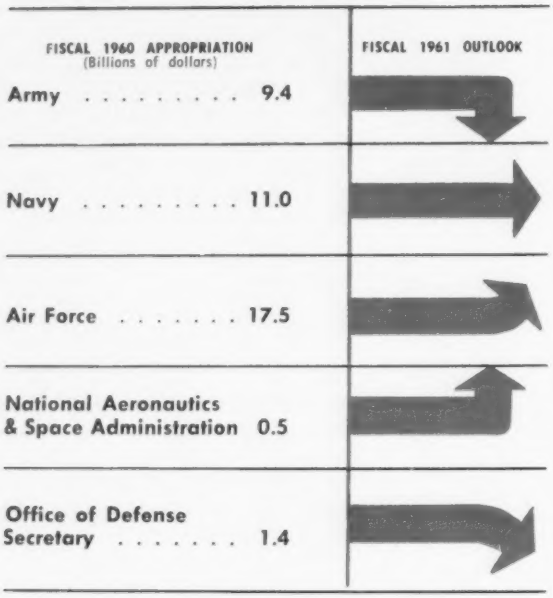
A NEW ROLLING mill to produce steel plates wider than any now available throughout the world will be built by U. S. Steel Corp. at its Gary Steel Works in Gary, Ind.

The facility, explains E. H. Gott, executive vice president-production, is designed as a combination 160 in. and 210 in. wide plate mill. This provision for rolling and flattening at either width is a steel industry "first."

Wide plates make possible greater design flexibility, thus reducing fabricating costs. "Increasing demand for wide plates of improved quality and in larger quantity than now available has been so great that the corporation took this immediate action," says Mr. Gott.

The new mill which will be capable of rolling single plates weighing up to 30 tons is scheduled for completion early in 1962. Construction will not interrupt production on the present plate facility at Gary.

Outlook for Defense Spending


FISCAL 1960 APPROPRIATION
(Billions of dollars)
FISCAL 1961 OUTLOOK
Army 9.4
Navy 11.0
Air Force 17.5
National Aeronautics & Space Administration 0.5
Office of Defense Secretary 1.4

METALWORKING'S SHARE of federal spending may decline a little in the 1961 fiscal year (July, 1960, to June, 1961). Its share of production money in defense contracts is certain to ease off some; the question is whether its share of research and development spending will rise enough to compensate for the declines.

The President will submit his budget for the new year in January, when Congress reconvenes. Reports indicate the federal spending program will approach $81 billion vs. about $79 billion this fiscal year and $80.7 billion in fiscal 1959. The rise next year will not occur in programs directly affecting metalworking. It will be the result of built-in factors, such as rising interest on the national debt, welfare programs, and inflationary trends in research and development programs for complicated weapons and space projects.

Missile Spending Will Rise

The outlook for the Pentagon: An all-out effort to contain fiscal 1961 spending within the current spending level of $41 billion a year. Missile spending will rise; aircraft spending will fall. Within the category of rising missile spending, a higher proportion of the dollars will probably go to research, a lesser proportion to production. Many important development programs are being stretched. Even such needed items as the Titan ICBM and Minuteman may be held back.

In his January recommendations, the President is certain to remember the will of Congress as expressed by its changes in the fiscal 1960 budget. Congress added funds for the Army Reserve and National Guard and increased appropriations for the Nike Zeus antimissile, the Navy's antisubmarine warfare capability, and the Minuteman. If Ike goes against Congressional trends in those areas, he is going to have another budget fight on his hands.

How Much of a Boost for Space?

Politically, the most dangerous area for the budgeteers is the space field. Dr. T. Keith Glennan, boss of the National Aeronautics & Space Administration, says: For the next 18 months, we will have to be content with present propulsion vehicles for space shots. They include the Redstone, Jupiter, Thor, and Atlas. He says we won't be able to fully utilize the capability of the Atlas until 1961.

To move into bigger boosters faster, the President has O.K.'d the transfer of Saturn to NASA from the Army. Army missilemen suggest NASA should add $240 million to its budget for fiscal 1961 to handle the Saturn alone. Another $30 million is needed immediately to keep key personnel on hand and the project on time. Look for a supplemental appropriation to the fiscal 1960 NASA budget as soon as Congress returns to lighten the load the fiscal 1961 budget will have to carry.

Conservative estimates for NASA next fiscal year run around $750 million vs. $500 million in fiscal 1960. Liberal estimates run to $1 billion.

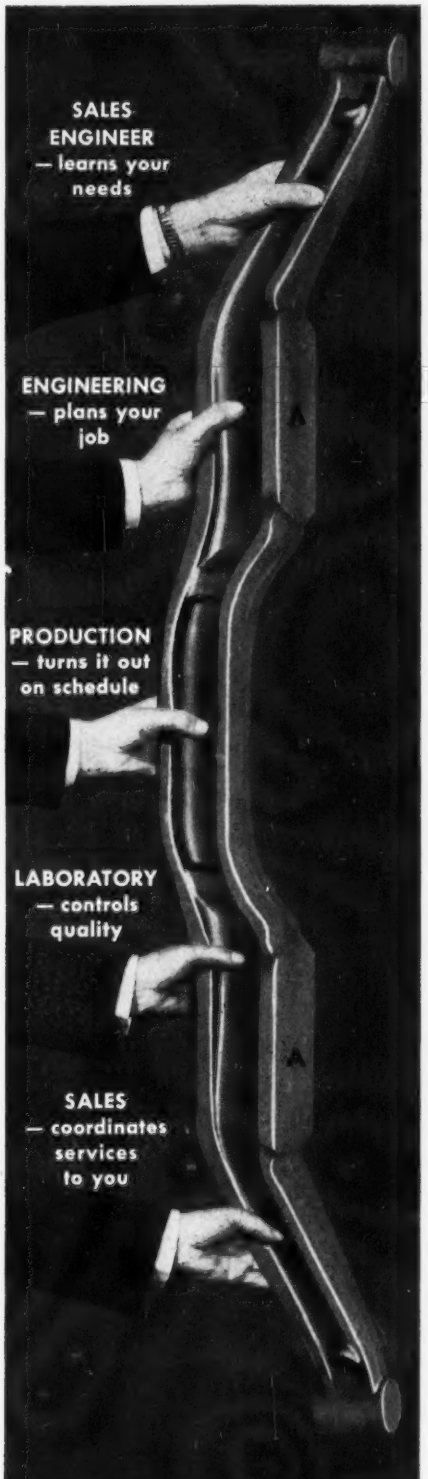
Aircraft and Ships Take a Beating

Among aircraft executives, the B-58 and B-70 remain large question marks. Reports firmly indicate the B-58 program is to be stretched out once again. Some day, the bomber is supposed to replace the B-47 in the Strategic Air Command. A few B-47 squadrons are scheduled to be cut from SAC, even though there are no replacements.

Rumors about the cancellation of the B-70 have been in circulation ever since the F-108 program was killed. Both the bomber and fighter were expected to take advantage of new high energy fuels. Now the B-70 is planned to utilize more common fuels. Its longevity is doubtful. We are bound to have many ICBM squadrons by the time its operational date is reached.

The Navy will not get the second atomic powered aircraft carrier it asked for this year. Arguments for another conventionally powered craft may prove futile. The Navy hopes to get more funds for aircraft carriers, Polaris launching, atomic submarines, and antisubmarine warfare capability by cutting back the size of its operational fleet and stretching out its shipbuilding and ship conversion (to missiles) programs.

The budget of the Atomic Energy Commission will probably hold at current levels, but a few projects may be augmented. It will be a case of cutting back on civilian efforts to allow the military to take quick advantage of the atom.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ENGINEERING — plans your job
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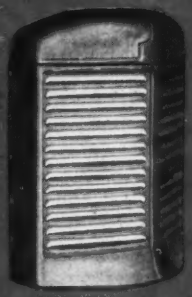

DEEP DRAWN STAMPINGS like this radiator grill are produced by T & W's Stamping Division. Stampings requiring draws up to 16 inches are produced in sizes up to 60 inches long by 40 inches wide.

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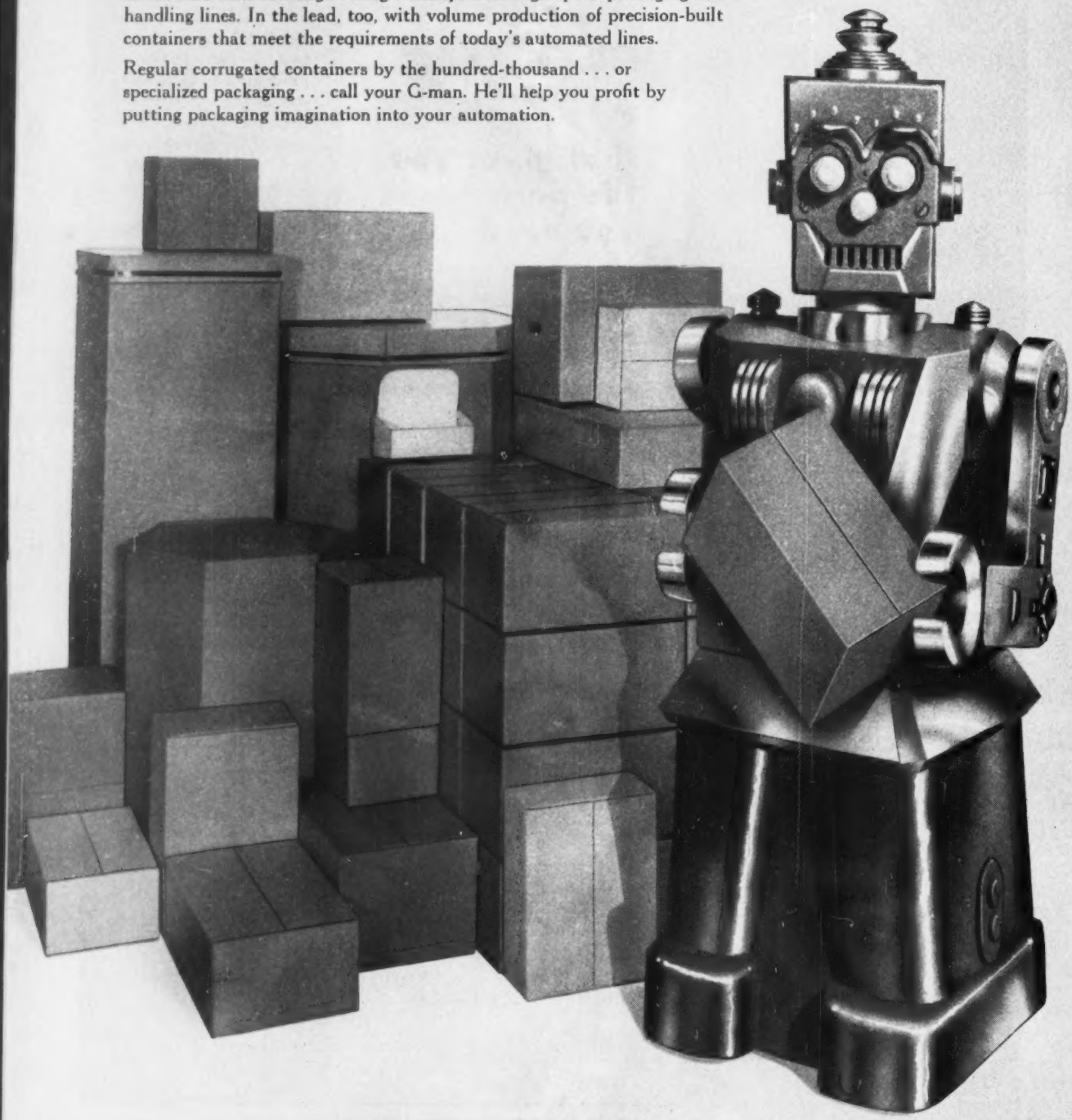

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Plastics: A Rising Metal Market

PROCESSORS of plastics, virtually unscarred in the 1958 recession, are offering even bigger and better markets for metalworking's machinery builders. Equipment suppliers are confident of snaring $115 million in sales this year and look for a 10 per cent improvement in 1960.

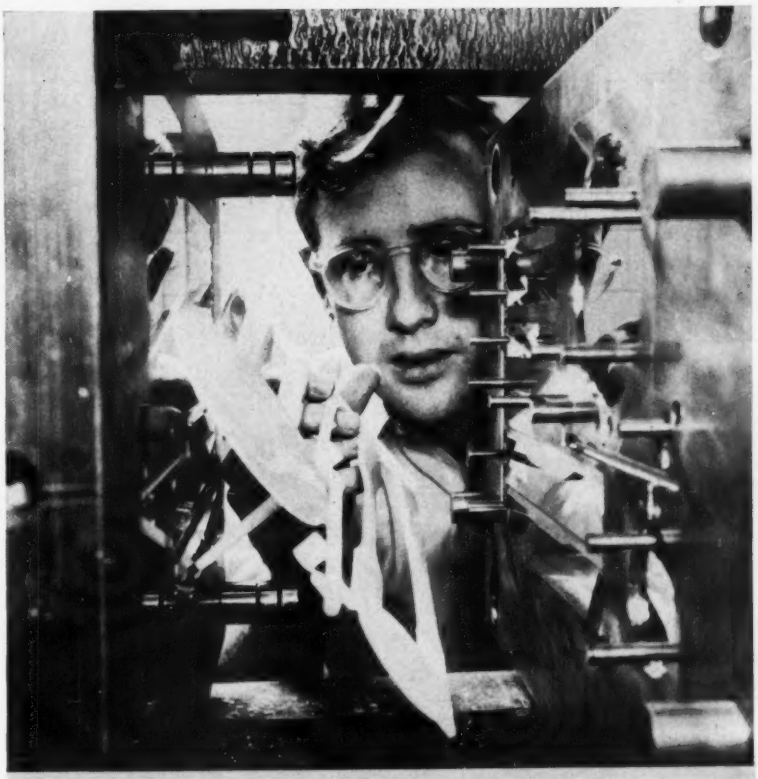
More than 65 machine producers sell plastic forming tools to 5000 U. S. plastic processors, fabricators, finishers, and basic resin producers.

Plastics production has leaped more than 300 per cent in the last decade. The shops of 2380 companies have about 16,665 compression machines, 12,575 injection machines, and 1050 extruding machines. Sales of molding machines this year topped those of 1958 by 10 per cent; 1958 volume bettered 1957's by about 7 per cent. The industry's mild downturn in 1958 started later and ended sooner than it did in most other segments of the economy, says E. W. Miller, president of Fellows Gear Shaper Co., Springfield, Vt.

• **Market Analysis**—Shipments of injection molding producers this year will hit $26.2 million, says T. G. Bishop, Hydraulic Press Mfg. Co., Mt. Gilead, Ohio. That segment of the industry had sales of $24 million last year, $22.5 million in 1957.

While injection molding presses with capacities up to 300 ounces are available, most machines shipped have capacities under 55 ounces. This year, estimated shipments include: 400 machines (capacity, 2.5 ounces or less), worth $4 million; 260 units (capacity, 10 to 18 ounces), worth $8 million; 318 units (capacity, 2.5 to 7 ounces), worth $5.7 million. Sales of machines with more than 55 ounces of capacity should reach $3.2 million this year. Prices of injection molding machines range from about $10,000 for a 2.5 ounce unit to about $70,000 for units with more than 55 ounces of capacity.

• **New Methods** — "Blow molding equipment and machinery for handling formed plastic are the newest areas opening up," says Mr. Miller.



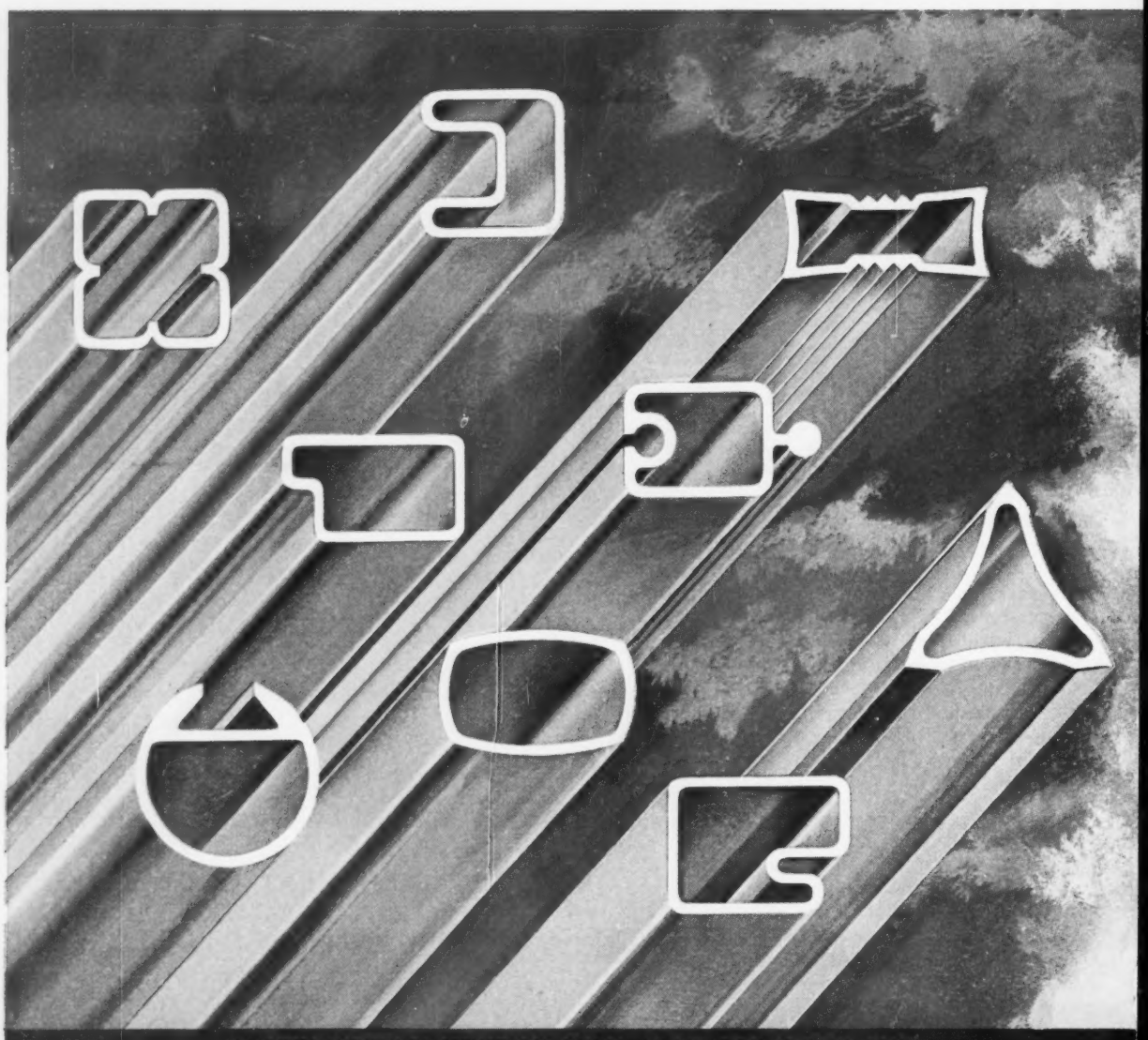
NEED FOR EQUIPMENT GROWS

Year	Sales of Plastics	Machines in Use†
1959*	$500 million	29,240
1958	470 "	27,500
1957	457 "	26,800
1956	450 "	24,500
1955	410 "	23,000
1954	370 "	21,521
1953	412 "	20,332

†Compression, injection machines.
Source: Society of the Plastics Industry Inc.
*Estimated by STEEL.

The blow molding technique employs air pressure to stretch and harden a plastic against a mold or die; the material is then cooled before removal from the mold.

A fully automatic machine, combining injection molding and extrusion, has been developed by Reed-Prentice Div., Package Machinery Co., East Longmeadow, Mass. It unites a toggle mechanism and platens with a 100 lb per hour extruder to mold thin walled cups in a 1.7 second cycle.



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Modular design concepts

Stitchless (garden chair) covering

Smooth (roll-slide) animation

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The first aluminum alloy ever developed expressly for furniture applications

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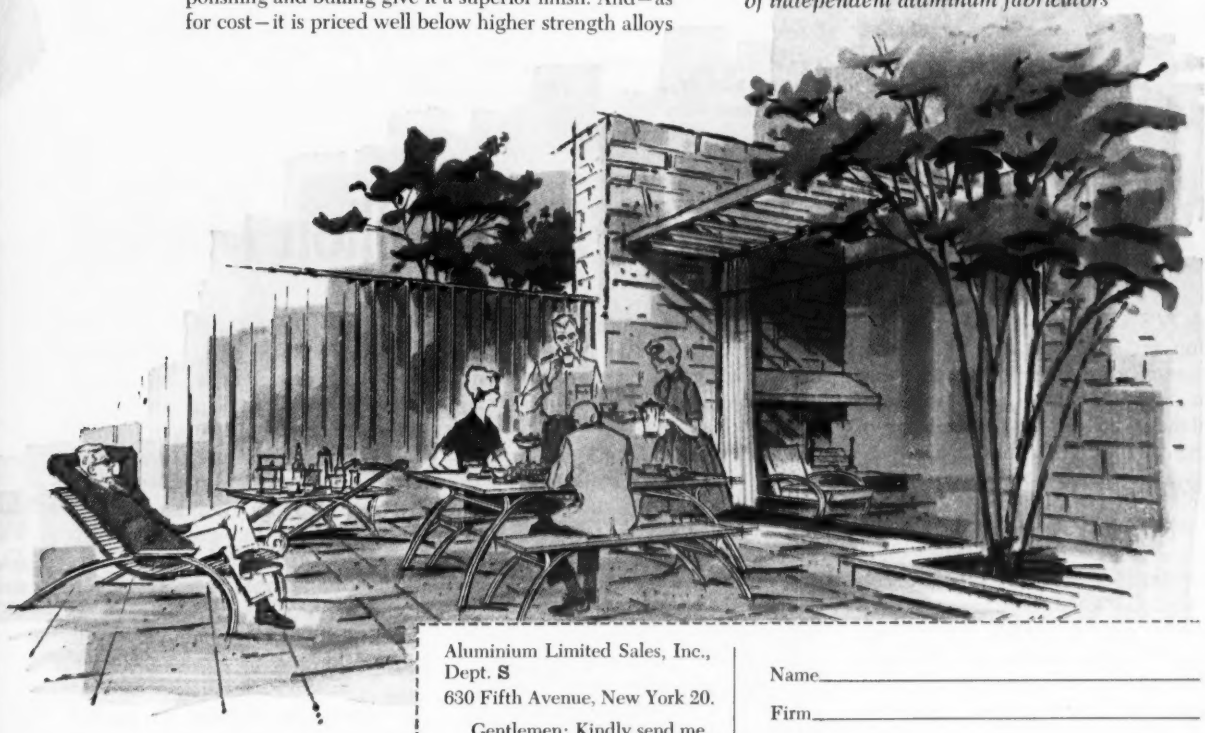

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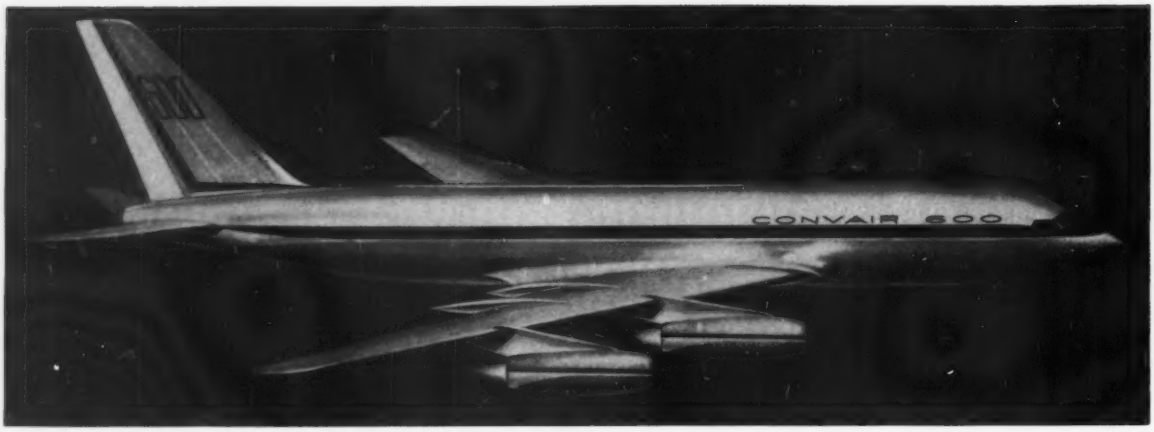


The nation's commercial jet fleet is creating a growing market for ground equipment.

Typical pieces of equipment used: Front (l to r) Boeing 707 towbar, scrubmobile, Freon service unit, air compressor, hydraulic test stand. Rear: Tow tractor, 125 kva generator, aerial platform, ramp sweeper, lavatory truck, water truck

Behind the Take-off: A $16 Million Market

MOVE THE time ahead two years. You get an urgent call to fly from your office in Detroit to a meeting in Los Angeles. Your company plane is tied up, so you call one of the commercial airlines. It has space on a flight leaving Detroit's Metropolitan Field in 1 hour.

If you don't keep luggage at your office, you call home, and your wife packs a bag which is collected by a special airport pickup service and preloaded into a baggage container en route to the field. You walk down to the street where a mobile "passenger pod" picks you up. Once on board, the purser takes your air credit card and prepares your tickets as the vehicle speeds out the Edsel Ford Expressway toward the terminal. (The purser will also make hotel reservations and arrange for ground transportation.)

At the airport, the "people pod" sweeps through the gate and up to your turbojet. As you step onto the loading conveyor, you see your preloaded baggage entering the plane.

It has been only 45 minutes since you got the phone call. Five hours later you're sitting at the conference table in Los Angeles.

• **Significance**—The incident may sound too good to be true, but it is founded on facts metalworkers can't afford to overlook.

First, you'll be one of 66 million passengers traveling by air during 1960. In 1965, you'll be one of 93 million. That's more than double the 45 million who used commercial airlines last year, and the Air Transport Association of America (ATAA) is counting on 118 million passengers by 1970. The figures foreshadow important changes.

Second, commercial aviation is entering its fifth re-equipment cycle since World War II. The conversion is to jets for passenger carriers. It necessitates changes in ground transportation, communications, and maintenance equipment which represent expenditures of millions of

dollars in newly designed and replacement facilities that must be provided by metalworking and allied industries.

• **Jot These Down**—The U. S. now has 3000 airports. Only 1500 have runways to handle big transport jets (over 3000 ft long). The Federal Aviation Agency will spend $57 million in fiscal 1960 for airport construction at 288 fields. It hopes to spend an equal amount the following year. The funds will be matched by the local project sponsors.

• We now have some 1600 operational commercial airliners, plus 65,000 nonmilitary aircraft—most of them are private and company planes. In 1938 we had only 345 commercial liners. By the end of next year, there should be 250 jetliners compared with 100 now, says the FAA. Best estimates put the number of commercial airliners by 1965 at 2500.

• ATAA reports that the nation's scheduled airlines plan to spend $3 billion over the next three or four years. Some $2.5 billion is for new planes, but the other half billion will go for ground facilities, ranging from better passenger handling systems to longer runways.

Don't forget the construction equipment for building and improving airfields. And preloaded baggage containers are already in use on American Airline's 707 jets. The investment will be triple the book value of the airline industry's present operating equipment, claims ATAA.

• **Here's Why**—Where does your firm fit into this picture? The lower photo on Page 72 shows some of the kinds of equipment American Airlines figures it needs to merely keep present planes flying. A leading aircraft association figures the cost of all support equipment for the country's major commercial fleets, excluding terminal and land costs, is worth $272 million. It has to be replaced at a rate of more than $16 million each year.

There are no accurate figures indicating how many companies contribute to the manufacture of aircraft support equipment. Usually, it amounts to a small slice of business for firms that supply industries like automotive, material handling, communications, and electronics. Example: Clark Equipment Co.'s industrial truck division sells fork lift trucks, tow tractors, and powered hand trucks to airlines and to aircraft manufacturers. Some 5 per cent of its sales come from the aircraft industry.

If you're in the automotive supply business, take a look at the needs of ground transporters that service air terminals. They include airport limousines, taxis, and bus services to and from fields. The Airline Ground Transportation Association reports its 127 member companies grossed $29 million in 1957 and used 1560 vehicles. AGTA anticipates a 40 per cent growth by 1965 to keep pace with a similar growth in airline traffic itself.

• **Here's What** — Beyond replacement business is the need for new types of support equipment for jets. Says ATAA: "The jet age is bringing great advances in loading and unloading techniques and facilities. Passengers will find waterproof shelters between terminals and jet aisles at second story levels. Enclosed gangplanks are being studied. Containers for preloading luggage will be utilized. To make passenger handling facilities more efficient, airlines now are spending $50 million in electronic equipment to help speed ticketing and reservations procedures."

The "people pod" is a good example of jet age thinking. It's a mobile transport, ticket office, and carrier for service between cities and the airliners themselves. Clark Equipment Co. introduced its prototype version in 1956. Chrysler Corp. now has a $750,000 FAA contract to develop a "moving waitingroom and elevator" to carry 60 to 90 passengers to and from jetliners. Delivery is scheduled for early 1961. It will be used at the Dulles International Airport near Washington.

Clark's "people pod"

• **Here's How** — You don't necessarily need missile knowhow to crack the commercial aircraft business, but you will need cost consciousness and imagination.

Electronics Speeds Ticket Service

AN ELECTRONIC computer developed for American Airlines by International Business Machines Corp. will process reservation transactions in 3 seconds. Present procedures require 45 minutes.

The pressure of increased air travel necessitated speedier handling. The new system, designated the IBM 9090, will handle and control reservation procedures from customer request to the time of arrival at his destination.

The result of six years of research by IBM and American, the system will be partially installed in late 1961 and serve most cities on American routes by the end of 1962.

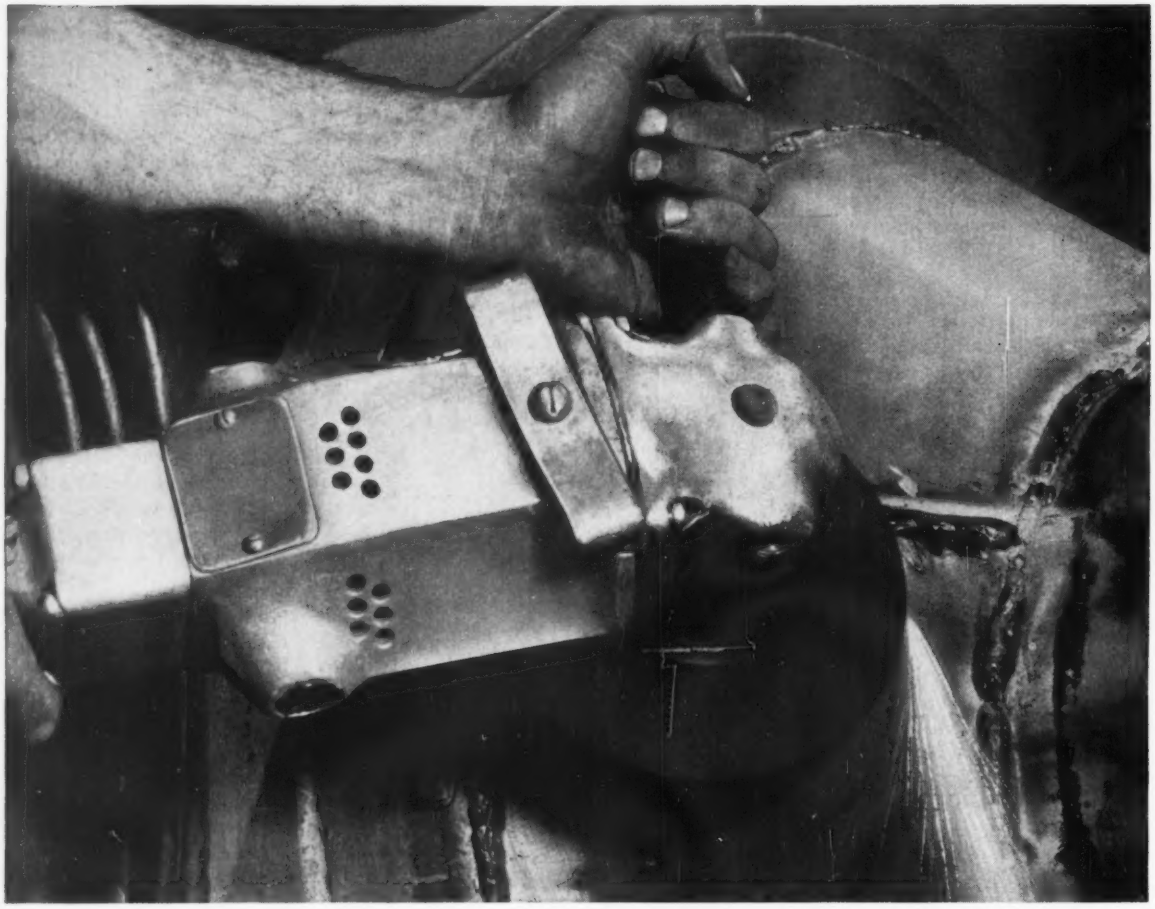
• **The system has three major elements:**

• Electronic Reservation Processing Center—This is the heart of the system and will be set up in New York. It will consist of two large scale transistorized computers each capable of executing 210,000 operations per second. The center will process agents' queries on reservations, report space available, and record transactions.

• Agent Sets—1100 sets installed in 61 cities will permit instant contact with the processing center. By coded cards and pushbutton, immediate disposition will be made of a customer's request on space, flights, arrival time, and flight connections.

• Communication Network — The agent sets and the processing center will be connected by 10,400 miles of telephone lines.

FLEXLITE RAISED HUB GRINDING WHEELS



Safety guard removed to illustrate full view of Flexlite Grinding Wheel

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From start to finish, U. S. Flexlite is the wheel that's built to reduce overhead. For smoothing and finishing welds, this is the most efficient, durable wheel in portable grinding. Comes in two types:

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Exit of the Edsel Spurs Rumors of Reshuffle at Ford

MOTORDOM foresaw Edsel's demise more than a year ago (see STEEL, Apr. 7, 1958, p. 75). Detroit is now asking: Is this only part of a bigger reshuffle in the Ford empire?

• **Looking Back**—When the "Big E" was introduced in 1957, it was hailed as the first car designed to fill a specific marketing need. Objective: To give young, middle class buyers another automobile they could trade up to in the Ford family.

Discussing Edsel's marketing philosophy, Richard Krafve, onetime general manager of the then separate division, told STEEL: "We believe automobiles are no different from any other business. The same general rules for making and marketing a product can apply." Oh-so-clear hindsight seems to indicate that the "rules" may have loopholes.

Ford spent $250 million to bring to market a car in four series and 18 models. It was aimed at filling the gaps on each side of Mercury. Mr. Krafve predicted first year sales of 200,000 units; but what he and apparently no one else could foresee was that: 1. Edsel was introduced on the verge of 1958's recession. 2. Car buyers switched quickly and enthusiastically to economy cars.

• **Edsel's Panned**—Sales of the 1957 model came to only 50,393. The total fell to 28,953 in 1958, then inched up to 30,120 this year.

As the slide progressed, Edsel was shorn of all but one series. The division merged with Lincoln and Mercury. Dealers, fluctuating between 1400 and 1100, were offered other lines, but many simply folded their sales tents and hastened to competitive ranks. Production was shifted from four assembly plants to one. Mr. Krafve and many of his staff departed.

As the 1960 model year opened, Edsel was being built on the Ford Div. assembly line at Louisville. Most of its parts were interchangeable with those of Ford cars. Even its much discussed oval grille was scrapped in favor of a 1959 Pontiac face and a wide track. Only two dealers were handling Edsels on an exclusive basis.

• **Edsel's Banned**—In the first ten days of this month, only 633 cars were sold compared with 2090 in the same period last year. Ford's other cars were selling 40 per cent above 1958's startup pace and accounted for 33 per cent of industry sales, including imports.

Edsel joined the ranks of more than 2500 other cars that "never quite made the grade." Total production was 110,748. Total investment was about half a billion dollars.

• **Quo Vadis?**—What will Ford do now?

The rumor circuit is loaded with reports about another reshuffle in the company's structure. Abandoning Edsel seems to be only a part of a continuing reorganization which is aimed at consolidating many of the company's engineering, planning, and purchasing functions. Ford doesn't comment officially, but engineers, purchasing people, marketers, and venders basically agree on this setup:

Lincoln-Mercury Div. will continue to function as a sales organization in 1960. It may handle the spring introduction of the Comet, Ford's second economy car (see STEEL, Oct. 12, p. 75). But next model year, Lincoln is expected to go it alone again saleswise. Mercury will be merged with Ford and share its 1961 body shell. The company has already shifted the four L-M assembly plants and purchasing activities into the Ford Div. Mercury may be split this way: Big "M" cars sold with Lincolns, a smaller Mercury marketed by Ford dealers.

• **Big Shift**—Engineering seems to

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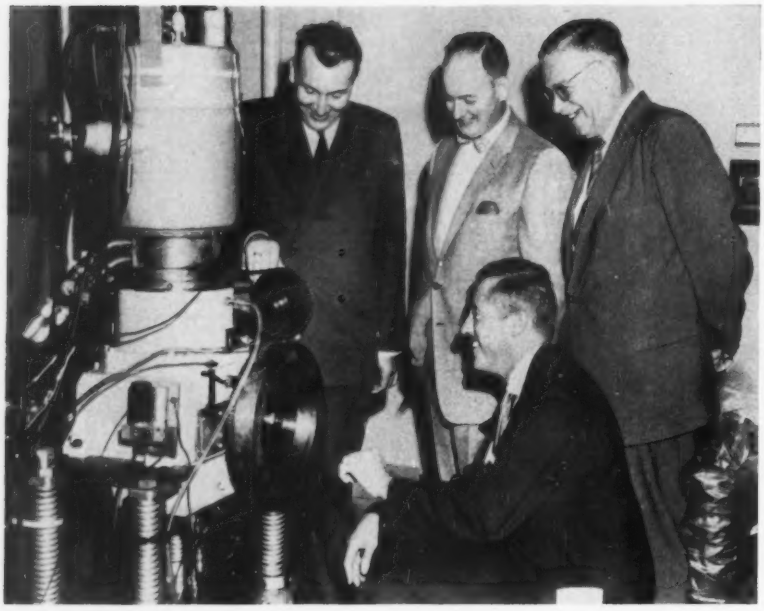

STIRLING THERMAL ENGINE, built by Philips' Gloeilampenfabrieken, Eindhoven, The Netherlands, is viewed by R. J. Meijer (left) and Dr. J. W. L. Koehler (right) of Philips and F. Earl Heffner (center), GM senior research engineer, and Gregory Flynn Jr. (seated), head, GM Research Mechanical Development Dept. The 40 hp single cylinder engine is one of three prototypes being tested under a research development contract made in 1958 between the two firms. The units, at the GM Research Laboratories, Warren, Mich., are said to be the first full size Stirling cycle engines to operate in the U. S.

be next. For all practical purposes, Comet engineering is already under Ford Div. control. Mercury groups are expected to follow. Informants say it will take another three or four months to realign staffs and functions to avoid overlapping.

Inevitably, some jobs are being eliminated, although the company indicates the reduction is slight. One of STEEL's sources claims accounting departments are hardest hit. At Lincoln-Mercury, the story is that the bumping procedure runs from executive engineers to department manager to section supervisor to group leader.

Ultimately, manufacturing, engineering, planning, and purchasing may be under Ford Div. control. The arrangement would eliminate much of the needless paperwork transfer that has been involved when Ford T-bird bodies are purchased from Lincoln by Ford Div. Mercury has been buying many of its bodies from Ford Div. assembly plants.

• **Hazy Future**—More speculation: After the hassle is over, Ford may again wind up with three car divisions. The Ford Div. will sell Ford and Mercury. The Lincoln Div. will keep the luxury car and whatever version of the T-bird that is coming up. A new "economy" division will be formed to market the Falcon, Comet, Ford's Ranchero (half car, half truck), and the small truck that's expected next year. The divisions will have marketing responsibility, but engineering and product planning will be Central Staff functions much as Chrysler has now.

Shifting markets and high costs involved in selling and building cars today make the reorganization an interesting possibility.

Light Turbine Developed

Medium horsepower, light weight, and low cost are key factors in the acceptance of a gas turbine engine developed by Williams Research Corp., Walled Lake, Mich. Several companies have reportedly ordered prototypes, and Uncle Sam says he's interested for marine and stationary power applications.

Weighing about 1 lb per horsepower, the engine has been developed at a cost of $1 million, says Sam Williams, company president. He adds: A 75 hp prototype has logged 15 months of test runs in a boat on the Detroit River.

"This turbine employs a new type of heat exchanger which uses exhaust heat (normally wasted) by reintroducing it into the engine to make more efficient use of fuel. The ultimate exhaust is cool enough to touch with the bare hand," Mr. Williams claims.

Baffled air intakes on the engine reduce the whine commonly associated with turbines. The marine prototype runs normally at 58,500 rpm and has operated up to 61,000 rpm. The power output shaft turns at 5000 rpm.

More than half the engine is made of aluminum alloys.

Patents are pending on the turbine and its components. Mr. Williams says his company expects to manufacture a version for aircraft applications. Licensing arrangements are being made with firms that may want the turbine for other uses. Several low cost manufacturing methods developed by the research company will permit the engines to be mass produced at lower production cost per horsepower than present piston engines, claims Mr. Williams.

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
August	239,152	180,447
September	258,157	130,460
October	507,530	261,701
10 Mo. Totals	4,844,219	3,135,973
November		514,152
December		593,920
Total		4,244,045

Week Ended	1959	1958
Oct. 24	112,488	70,973
Oct. 31	101,616	97,804
Nov. 7	63,451	125,279
Nov. 14	64,230	117,688
Nov. 21	67,687†	138,727
Nov. 28	65,000*	123,008

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

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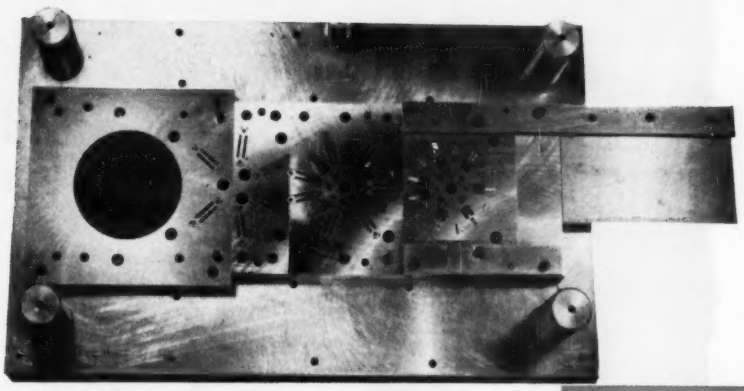
For full details about Rust Veto 377 send for NEW ILLUSTRATED BULLETIN or for help on any industrial rust prevention problem, call or write: E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.



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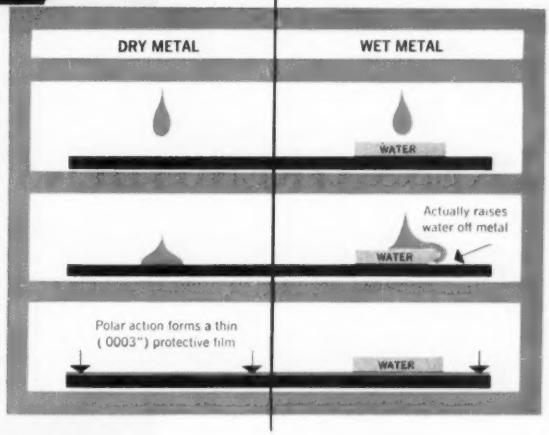

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Now the nation's third largest steel plate producer

Protecting product quality is the responsibility of Lukens' Metallurgical Division. Four members of this expanded control team are, left to right: Sam Lemmon, Metallurgical Service; Lou Mandich, Manager; Howard Turner, Inspection; and Joe Althouse, Chief Metallurgical Engineer.

LUKENS STRENGTHENS THE GUARD ON QUALITY

To the steel buyer, Lukens' new ranking as a steel plate producer means more than increased tonnage. It promises complete confidence in buying decisions. For, together with the expansion of its steel making facilities, Lukens has strengthened its control over plate quality at every step—from open hearth to customer's shop.

The men assembled above in Lukens' new Physical Testing Laboratory spearhead this increased control. Working with the industry's broadest range of plate materials—from ordinary carbon steel to ultrasonically tested hullplate for nuclear submarines—these experts represent the emphasis Lukens places on dependable plate quality.

Now consolidated into one closely working team are these vital functions: Inspection, Plant Metallurgy, Metallurgical Development, Quality Control and Metallurgical Service. Under Lou Mandich's direction, and together with Lukens' other operating and marketing groups, they are successfully pursuing the overall aim of our expansion program: *capacity and quality levels to meet the growing needs of our plate fabricating customers.*

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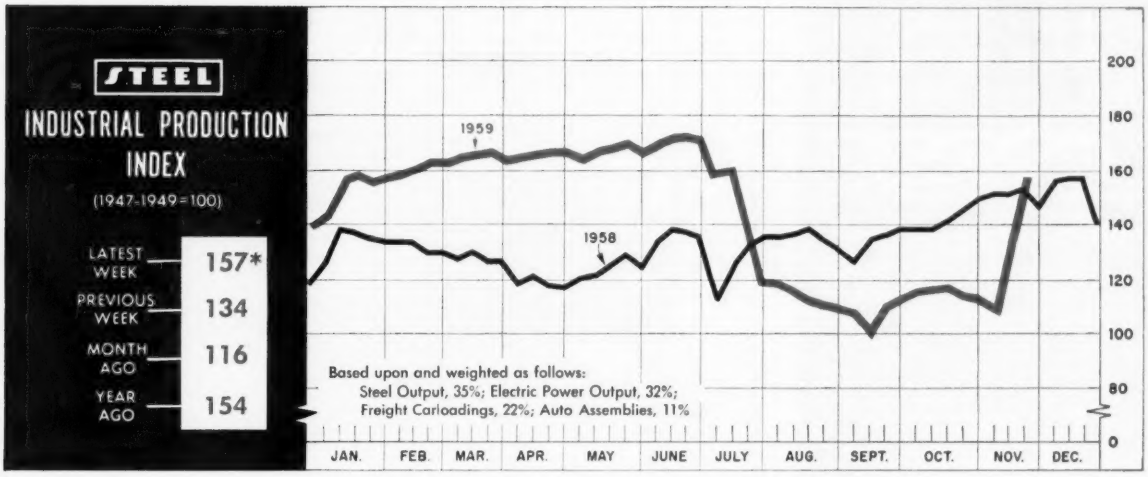

*Week ended Nov. 21.

Strike Recovery Faster than Usual

THE ECONOMY is moving again. Most industries which marked time while the steelworkers marched in their picket lines are beginning to pick up the prestrike tempo.

But the momentum may be held in check because many fabricators, who kept the over-all economy from slipping seriously during the strike, are doing an about-face as they run out of metal.

• **Index Rising Rapidly** — STEEL's industrial production index moved ahead of the year-ago level in the latest period for the first time since the strike began. The preliminary reading of 157 (1947-49=100) for the week ended Nov. 21 is the best the index has done since the second week in July, just before the steel mills shut down. While it is still well below the record of 174 chalked up twice in June, it represents one of the fastest recoveries from a major strike in recent history. The timetable is about one week ahead of the pace set after the 1956 walkout.

Leading the way is steel production. Operating at only 13.5 per cent of capacity the week before the Taft-Hartley injunction was put into effect, the industry zoomed up to about 79 per cent during the week ended Nov. 22. That alone added over 40 points to the sagging index. The rate was scheduled to advance to 88 per cent in the week ended yesterday (Nov. 29).

• **Secondary Effects** — During the first full week following the injunction, the nation's railroads got a sample of the feverish shipping activity that is expected to mark the rest of the year. Total loadings shot up almost 78,000 cars, with the biggest gains coming in ore and miscellaneous freight loadings (including steel and metalworking products). During the strike, loadings were about 150,000 cars a week under what they would have been normally, says the Association of American Railroads. Unless steel users' slow-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	2,492[1]	2,233	1,988
Electric Power Distributed (million kw-hr)	13,500[1]	13,270	12,579
Bituminous Coal Output (1,000 tons)	8,940[1]	7,535	8,759
Crude Oil Production (daily avg—1,000 bbl)	6,875[1]	6,876	6,975
Construction Volume (*ENR*—millions)	$372.1	$444.3	$243.0
Auto, Truck Output, U. S., Canada (*Ward's*)	82,710[1]	79,403	171,967
TRADE			
Freight Carloadings (1,000 Cars)	665[1]	638	619
Business Failures (Dun & Bradstreet)	285	265	274
Currency in Circulation (millions)[3]	$32,235	$32,105	$31,754
Dept. Store Sales (changes from year ago)[3]	+6%	+5%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$28,206	$22,353	$25,396
Federal Gross Debt (billions)	$290.5	$291.0	$280.2
Bond Volume, NYSE (millions)	$35.3	$34.2	$33.3
Stocks Sales, NYSE (thousands of shares)	17,136	16,195	20,714
Loans and Investments (billions)[4]	$104.3	$105.2	$93.7
U. S. Govt. Obligations Held (billions)[4]	$27.7	$28.1	$31.3
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	231.9	232.1	217.5
All Commodities[7]	118.9	119.2	119.1
Commodities Other than Farm & Foods[7]	128.6	128.7	126.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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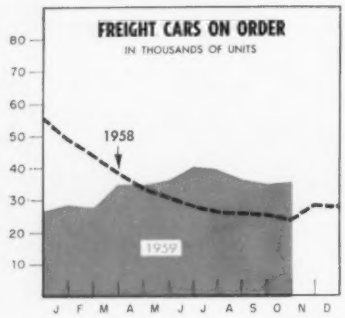
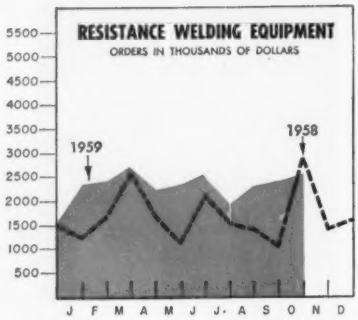
THE BUSINESS TREND





	Awards		Backlogs (end of month)	
	1959	1958	1959	1958
Jan. ..	4,007	401	29,470	48,787
Feb. ..	1,803	287	28,789	43,750
Mar. ..	10,792	204	35,487	38,027
Apr. ..	3,736	400	35,479	32,908
May ..	5,203	1,391	36 869	30.386
June ..	8,054	320	40,973	27,757
July ..	4,159	377	40.309	25.994
Aug. ..	1,753	1,773	37,172	25.611
Sept. ..	945	1,585	35,626	24.982
Oct. ..	2,722	666	36,199	23,670
Nov. ..	....	6,295	.....	27,962
Dec. ..	....	3,706	.....	27,596
Total ..	....	17,414		

American Railway Car Institute.

	Net Orders		Shipments	
	1959	1958	1959	1958
Jan.	2,396	1,243	1,427	1,422
Feb.	2,457	1,683	1,889	1,615
Mar.	2,811	2,550	2,179	1,659
Apr.	2,258	1,684	2,193	1,963
May	2,407	1,121	2,019	1,750
June	2,597	2,113	2,702	2,346
July	1,980	1,534	2,269	2,342
Aug.	2 322	1,431	2,928	1,419
Sept.	2,435	1,060	2,113	1,125
Oct.	2,599	2,885	2,097	1,559
Nov.	....	1,409	....	1,102
Dec.	....	1,554	....	1,357
Totals ...	....	20,258	....	19,659

Resistance Welder Manufacturers' Assn.

Charts copyright, 1959, STEEL.

downs reach catastrophic proportions, you can expect further gains in freight carloadings.

Output of electricity also rose significantly following resumption of steelmaking activity. The gains were largest in steelmaking centers. In Pittsburgh, power production jumped about 23 per cent during the first week. From now until Christmas, this business barometer will move steadily upward, probably reaching an all-time peak during the Christmas week.

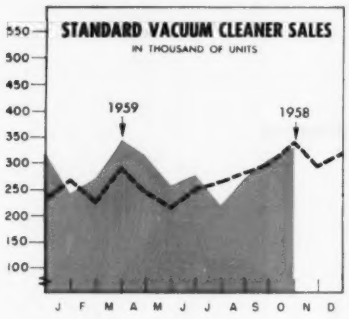
• **Autos Holding Own**—Auto production, which had been expected to decline until early December, seems to be holding its own. During the first three weeks of November, producers turned out about 77,000 cars and trucks a week, with practically no signs of further cutbacks. Worker recalls, rather than furloughs, now dominate the news in this important industry, as steel supplies begin to trickle in.

• **Other Good Signs**—Outside of STEEL's index, there are other barometers which reflect the rosier glow of the business picture. In Pittsburgh, the weekly index of business activity compiled by the Bureau of Business Research of the University of Pittsburgh shot up to 99.3 per cent of the 1947-49 average during the week ended Nov. 14. It was only 67.9 per cent the week before, 120 at the record level before the strike.

In the Nov. 14 week, bituminous coal producers pushed production up to 8,940,000 net tons from 7,535,000 the previous week. That's the best output since the last week in June.

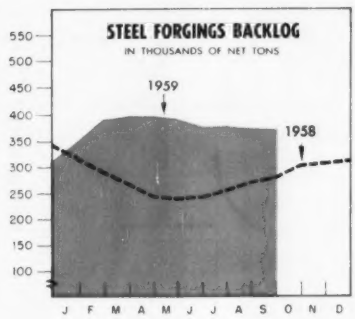
The construction industry also appears to be shaking off the dulling effects of the steel strike. Contract awards in the week ended Nov. 19 totaled $372.1 million, raising the year-to-date total to $18.4 billion, reports *Engineering News-Record*. This brought the year-to-year cumulative gain to 5 per cent. A week earlier, the gap was only 4 per cent. Biggest awards during the latest period were for industrial building and mass housing.

Bank clearings in 26 leading cities surveyed by Dun & Bradstreet Inc. rose to a record of $28.8 billion during the week ended Nov. 18. This indicator of general business conditions has remained strong throughout the strike period, so the latest record may not be attributed directly to an upsurge in confidence fol-



	1959	1958	1957
Jan.	242,516	265,489	276,738
Feb.	271,396	225,631	300,887
Mar.	346,557	291,418	312,746
Apr.	317,402	247,293	281,627
May	257,345	218,766	231,246
June	275,974	253,127	207,286
July	221,232	263,778	218,276
Aug.	268,465	280,226	241,218
Sept.	305,096	299,618	302,869
Oct.	330,899	339,127	328,655
Nov.	.....	293,609	251,123
Dec.	.....	316,965	237,501
Totals ...	.....	3,295,047	3,190,172

Vacuum Cleaners Mfrs.' Assn.



	Shipments 1959	Shipments 1958	Unfilled Orders 1959	Unfilled Orders 1958
Jan. ...	113	108	353	318
Feb. ...	113	93	392	289
Mar. ...	129	92	396	266
Apr. ...	136	83	398	242
May ...	142	78	394	240
June ...	140	88	375	246
July ...	103	67	377	256
Aug. ...	98	80	376	279
Sept. ...	103	89	374	287
Oct. ...	...	100	...	303
Nov. ...	...	89	...	307
Dec. ...	...	113	...	313

U. S Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.

lowing the resumption of steelmaking. But it shows the basic soundness of the business uptrend.

Barometers Still Strong

Business reports coming in from industries—covering September and October—show unusual strength, considering that many producers were slowing down noticeably late in the third quarter to conserve steel and copper supplies. It is still assumed that some of the reports will show significant declines during the fourth quarter.

For instance, freight car builders shipped almost as many cars (2147) in October as they did in September. But their backlogs increased from 35,629 on Oct. 1 to 36,199 on Nov. 1 because of the increase in orders. (See graph, Page 80.)

Shipments of resistance welding equipment in October showed only a fractional decline from September's total, while orders advanced. (See graph and table, Page 80.)

Manufacturers of vacuum cleaners produced 2.4 per cent fewer units in October than they did in the corresponding 1958 period (see graph above), but they showed no signs of slowing down as they topped the September total.

Producers of steel forgings, who saw shipments slump in July and August, reversed the trend slightly in September, partly at the expense of backlogs. (See graph above.)

Wholesalers of industrial supplies and equipment, who still report an inventory position 3 per cent better than they had a year ago, had a sales increase of 5.3 per cent in October, says the National Industrial Distributors' Association.

Factory sales of home laundry appliances dipped only slightly in October, ending up 3 per cent shy of the September mark, reports the American Home Laundry Manufacturers' Association.

Record for New Charters

Growth of the business community spurted again last month as new incorporations set a record while business failures declined. Dun & Bradstreet Inc. report that the 14,526 charters issued in October set a high for that month. Failures dropped to 1125, the first time in three months they have undercut the corresponding 1958 figure. Total liabilities fell to $50.4 million, the lowest since July. The casualty rate dropped to 50.5 per 10,000 listed firms.

In a recent nation wide survey of honeycomb section manufacturers by an independent research organization, 75% of the responders indicated that uniform thickness of the thin metal core material was the most important factor demanded of suppliers.

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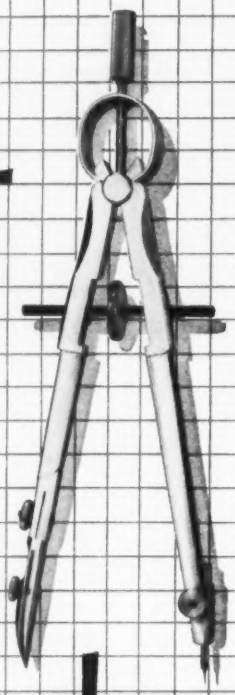

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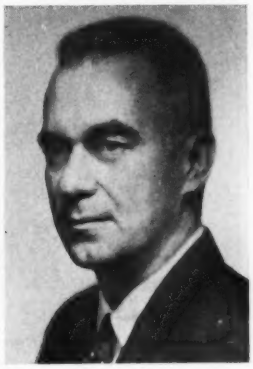


RICHARD Y. MOSS
Toledo Scale Div. gen. mgr.

M. R. McLary was elected executive vice president and manager, **Ingersoll Products Div.**, Chicago, Borg-Warner Corp. He has been with Ingersoll since 1952, starting as chief engineer and advancing to vice president-works manager before election to his present post.

Milton R. Watko was made chief engineer, **Ransohoff Co.**, Hamilton, Ohio. He was chief engineer, Machine Div., International Conveyor & Washer Co. At Ransohoff, he is in charge of product design and development.

Product managers appointed for the **Rome Cable Div.**, Rome, N. Y., Aluminum Co. of America: **F. R. Dallye,** electrical conductor accessories; **W. W. Knapp,** overhead transmission and distribution conductors; **D. H. Thayer,** building construction conductors; **J. R. Woods,** power conductors.

Von R. Kaufman was appointed president, **Hayes Steel Products Ltd.**, Merritton, Ont. He succeeds **J. E. Martin,** now chairman. Mr. Kaufman, previously a vice president, continues as general manager. Hayes Steel is the Canadian affiliate of Dana Corp., Toledo, Ohio.

David D. Walker was made assistant chief engineer, **Erickson Tool Co.**, Solon, Ohio.

John F. Biehle was named to the new post of technical director, Beryllium Components Div., **Astrometals Corp.**, Hawthorne, N. J. He was with Misco Precision Casting Co.

L. H. Whitney was made senior vice president, **Hanson-Whitney Co.**, Hartford, Conn. In addition to administrative duties, he will engage in development of expanded research. Mr. Whitney was president of Whitney Chain Co.

Fred C. Stockinger was appointed sales manager, **Bay State Abrasive Products Co.**, Westboro, Mass. He was assistant sales manager.

Robert Rosendahl was made purchasing agent for the Milwaukee plant of **Babcock & Wilcox Co. Bertram A. Miller** was named assistant purchasing agent.

Robert C. Robertson was promoted from sales director to vice president-sales, a newly created post at **Acme Industries Inc.**, Jackson, Mich.

L. L. Grant was named marketing manager, Semiconductor Dept., **Westinghouse Electric Corp.** He is at the semiconductor plant at Youngwood, Pa. Mr. Grant was manager, Machinery & Equipment Industry Section, Industrial Sales Dept.

James LaBay was made director of purchases for **AP Parts Corp.**, Toledo, Ohio. He succeeds **B. W. Lang.**

Clinton V. Newman was promoted to product manager-rod and wire by **Chase Brass & Copper Co.**, Waterbury, Conn., subsidiary of Kennecott Copper Corp. He was a salesman assigned to the Chase district office in Detroit.

Richard Y. Moss was named to the new post of general manager, **Toledo Scale Div.**, Toledo Scale Corp., Toledo, Ohio. He also was elected a vice president of the corporation. He was manager of the Fabricating Div. of Lukens Steel Co.

At the Middletown, Ohio, Works of **Armco Steel Corp., Vernon W. Jones** was made assistant to general superintendent. He is succeeded by **Harry Holiday** as assistant general superintendent, steel plant. **Kenneth Haley** was made superintendent, blast furnace, Middletown plant.

L. A. Harrison was made general sales manager; **Philip A. Gaebe** assistant general sales manager, Eastern Div., **Kaiser Refractories & Chemicals Div.**, Kaiser Aluminum & Chemical Corp. They are in Pittsburgh.

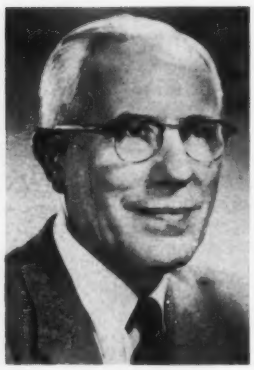
John R. Wierdsma was made sales manager-Export Div., **Weatherhead Co.**, Cleveland. He had headquarters in Rotterdam, the Netherlands, as manager of Weatherhead sales in Europe.

Byron van Steenburgh assumes the new post of sales administration manager, **Bunting Brass & Bronze Co.**, Toledo, Ohio. He is succeeded by **William J. McTighe** as head of the Special Sales Div. **Parker E. Holt** transfers from Chicago to Boston to replace Mr. McTighe as New England district manager.

Edward D. James was named regional manager of the newly combined Philadelphia and metropoli-

DANIEL J. DE CARLO JOHN POWERS

Verson Allsteel Press appointments



HENRY M. HEYN EUGENE P. HEILES

Midland-Ross vice presidents

tan New York sales territories of **Wilton Tool Mfg. Co. Inc.**

Daniel J. De Carlo was made manager, Contract Div., **Verson Allsteel Press Co.**, Chicago, responsible for contract machining and fabricating operations. **John Powers** was made manufacturing manager. He was chief field engineer-hot and cold forging equipment. **Harry L. Reynolds** was appointed vice president-district manager, Wisconsin.

Robert E. Mills was named midwestern district sales manager for the Continuous Cast Products Dept., **American Smelting & Refining Co.** He is at the Whiting, Ind., office.

Burton M. Levinson was made assistant to the president of **Levinson Steel Co.**, Pittsburgh.

John A. Royal was made manager-vulcanized fibre sales, **Taylor Fibre Co.**, Norristown, Pa.

C. Edward Wolfe was appointed a vice president, **Cardox Div.**, Chemetron Corp., Chicago. He is general manager of Cardox's carbon dioxide activities.

Robert E. Cook was made sales manager, **S A E Steels Inc.**, Cleveland.

Harry R. Johnson was made assistant general sales manager in charge of the New York district sales office of **Jones & Laughlin Steel Corp.** He was manager of tin mill products in the general office, Pittsburgh. **John O'H. Anderson**, former New York district sales manager, is serving as consultant to the assistant general sales manager-New York until he retires Jan. 31. **W. F. Donaldson Jr.**, Cincinnati district sales manager, succeeds Mr. Johnson as manager of tin mill products in Pittsburgh. **A. C. Pollock Jr.** succeeds Mr. Donaldson, and continues in charge of the sales office at Columbus, Ohio.

Elmer C. Stacks was made district manager, Baltimore, Virginia, and eastern Pennsylvania areas for **Morse Twist Drill & Machine Co.**, a division of Van Norman Industries. He is in Philadelphia .

Glenn R. Strouse was made assistant sales manager, **Shelby Metal Products Co.**, Shelby, Ohio. He was with Shelby Cycle Co.

David A. Davies was named southern district sales manager for **Mallory-Sharon Metals Corp.** His headquarters are in Dallas.

Gilbert Johnson was made sales manager, Can Making Machinery Div., **Max Ams Machine Co.**, Bridgeport, Conn. He was with J. L. Lucas & Sons Inc.

Wolverine Tube Div., Allen Park, Mich., Calumet & Hecla Inc., promoted **R. E. Seaton** to manager of processing and power sales.

Reuben O. Schlegelmilch was made technical director, Defense Products Group, **Westinghouse Electric Corp.** He is in Washington.

M. A. Young & Co. appointed **Norman Ruderman** assistant manager, Chicago district office. In addition to buying for the brokerage activities of the company, he will also be vice president-scrap purchases for Stainless Processing Co., an affiliate.

Henry M. Heyn and **Eugene P. Heiles** were made vice presidents of **Midland-Ross Corp.** Mr. Heyn will head up Surface Combustion Div. (newly acquired), Toledo, Ohio. He was president of Surface Combustion Corp. **Mr. Heiles**, former vice president-controller of Surface, assumes new duties as general manager, Toledo operations.

American Chemical & Refining Co., Waterbury, Conn., named **George Dietz Jr.** executive vice president and general manager; **Quentin A. Dietz** vice president-general sales manager. **Newell W. Mitchell** was named director-research and development.

A. L. Vandergriff, former vice president, Lummus Cotton Gin Co., Columbus, Ga., was elected president of **Continental Gin Co.**, Birmingham. He succeeds **E. H. Brooks**, resigned.

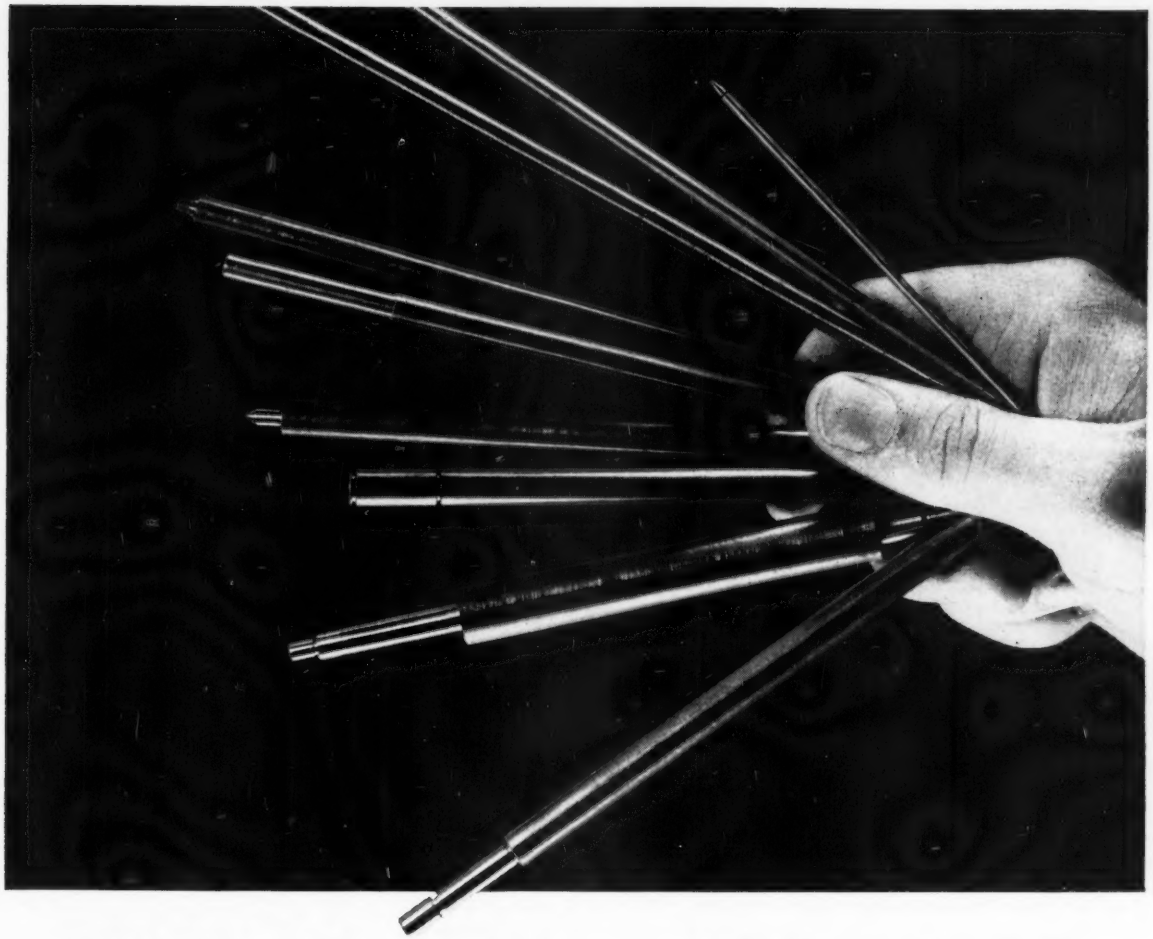
James A. Hudson was made western sales manager-bulk gas sales by **Linde Co.**, a division of Union Carbon Corp., New York.

Leo I. S. Conway was made regional sales manager, **Continental Mfg. Co.**, in New York. He was with Walworth Co.

Leo R. Silliman was made superintendent, Steel Conditioning & Finishing Depts., at the Buffalo plant of **Republic Steel Corp.** He succeeds the late **Richard J. Hoar.**

L. Merle Hoffman heads the combined cost and treasury departments of **Ohio Seamless Tube Div.**, Shelby, Ohio, Copperweld Steel Co.

Eben C. Hall was made director of export sales, **American Car &**



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Facts about Kodak Contour Projectors are spelled out in a brochure which you can get by writing to the address below. After you've had a chance to look over the contents of the book, we'd like to demonstrate *why* and *how* one of the six Kodak models will best fit your inspection needs.

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CLIFFORD R. CRUSAN
Turbocraft president

CARL A. BROWN
joins Minneapolis-Moline

GERALD D. MINNICK
Conforming Matrix div. dir.

Foundry Div., ACF Industries Inc., New York.

Clifford R. Crusan was appointed president and general manager of **Turbocraft Inc.**, Pasadena, Calif. He was sales manager.

Walter T. Brown was elected a member of the executive committee of **United Forge Co.**, Detroit. He recently retired from Kelsey-Hayes Co.

J. G. Henderson was made manager of industrial sales for the Atlantic district of **General Electric Co.'s** Apparatus Sales Div. He is in Philadelphia. He is succeeded by **J. F. Cronin** as manager of paper and light industry processes in the Industrial Commercial Section at Schenectady, N. Y.

Hugh S. McLetchie was promoted to president, **Samuel Olson Mfg. Co.**, Chicago, subsidiary of Cherry-Burrell Corp. He succeeds **Peter Olson**, retired. Mr. McLetchie was secretary-treasurer.

Carl A. Brown was appointed chief hydraulics engineer at **Minneapolis-Moline Co.**, Hopkins, Minn. He was assistant chief engineer, Industrial Controls Div., Vickers Inc.

Gerald D. Minnick was made director of the new Semi-Conductor Equipment Div. of **Conforming Matrix Corp.**, Toledo, Ohio. The division will concentrate on development of machines for coating coaxial lead components. **Leo McHue**, general manager, was appointed vice president.

Thomas F. Moormann, metallurgist, formerly with Peninsular Steel Co., joined the Detroit field section of **International Nickel Co. Inc.**

M. L. Hiller was made assistant to the president, **Elliott Co.**, Jeannette, Pa. He heads a new government business office in Washington.

Ralph E. Clarridge was made manager-measurements laboratory at **General Electric Co.'s** Instrument Dept., West Lynn, Mass.

John F. Tobin was appointed vice president - marketing, **American Standard Industrial Div.**, Detroit, American Radiator & Standard Sanitary Corp. He was a regional manager for the Industrial Div. Mr. Tobin's appointment fills a vacancy created by retirement plans of **E. W. Petersen**, who will remain a vice president and market consultant to the division until Jan. 1, 1961, effective date of his retirement.

Vern I. McCarthy Jr. was named president and director of marketing, **Vulcan Containers Inc.**, Bellwood, Ill. He succeeds **Vern I. McCarthy Sr.**, who becomes chairman. The new president was vice president-marketing, and director of sales.

John L. Scarry was made general superintendent of the Ambridge, Pa., plant of **A. M. Byers Co.** He was superintendent of steel producing at Edgar Thomson Works, U. S. Steel Corp., and also served as chief metallurgist at that plant.

Dominion Steel & Coal Corp. Ltd., Montreal, Que., appointed **C. M. Anson** vice president-general manager, steel operations. He was vice president-general manager of the Sydney Works. **C. N. Murray** was made general manager of four Atlantic province operations, including the Sydney Works.

John C. Cassidy was made manager of product projects for **American Car & Foundry Div.**, ACF Industries Inc., New York.

OBITUARIES...

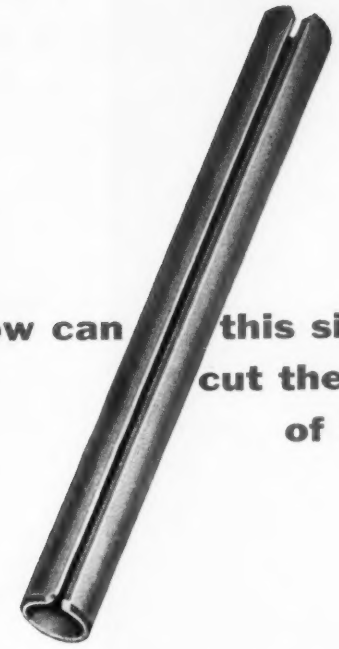
William E. Smith, 52, purchasing agent, **Ansco Div.**, Binghamton, N. Y., General Aniline & Film Corp., died Nov. 7.

Ralph P. Garrison, president, **Garrison Machine Works Inc.**, Dayton, Ohio, died Nov. 15.

David McVey, engineer in **Climax Molybdenum Co.'s** Chicago office, was killed in a plane crash Nov. 17.

Robert C. Norton, 79, honorary chairman, **Oglebay Norton Co.**, Cleveland, died Nov. 22.

Alfred J. Talevi, superintendent, **Worcester Gear Works Inc.**, Worcester, Mass., died Nov. 15.



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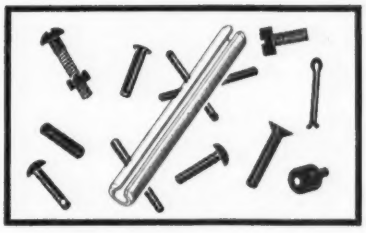
Rollpin readily replaces taper pins, grooved pins, straight pins and set screws; it can be used as a locating dowel, hinge pin, cotter pin, stop pin or, in some applications, even as a rivet. Thus, when you standardize on a Rollpin you can drastically reduce the variety of fasteners in your inventory—save money in purchasing, storage space and stock handling.



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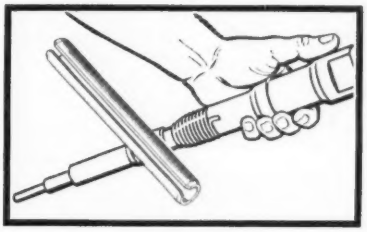

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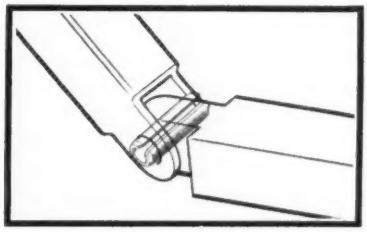

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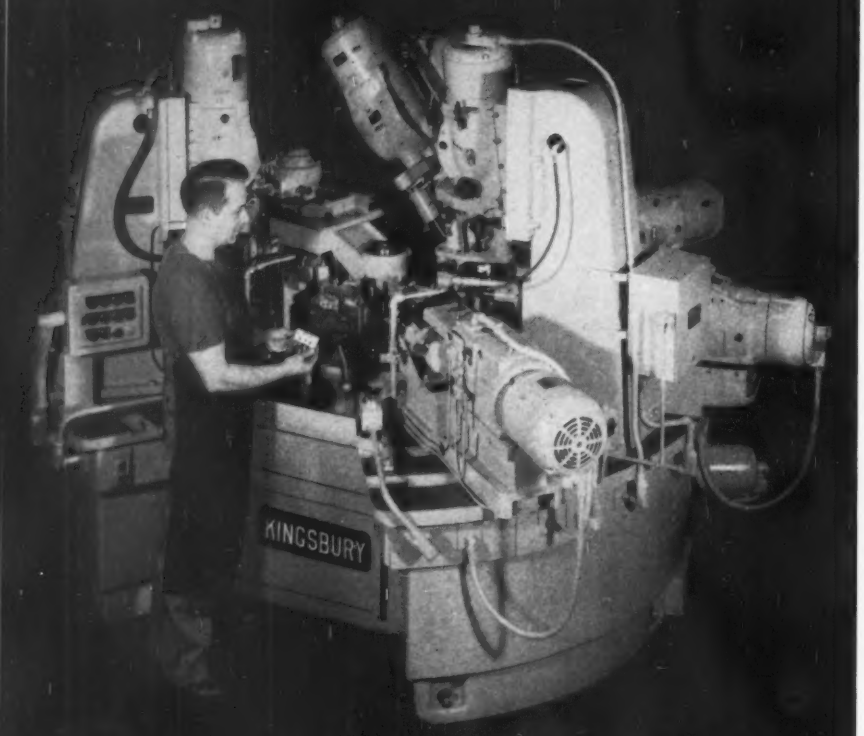
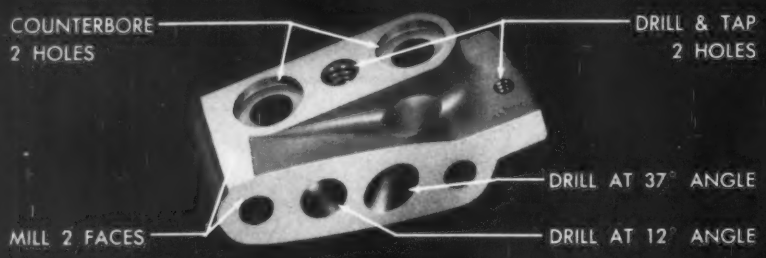


10-spindle Kingsbury combines milling with other operations



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Two units each mill one face with a finish better than 80 micro. Both units are at the operator's left — one vertical and one horizontal.

On the right are five units — angular, vertical and horizontal. They operate on four holes — drill, counterbore and tap.

Production is 360 parts per hour gross. Seven duplicate work fixtures (on a 30-inch index table) make possible operations on six parts while the operator changes parts at the loading station.

All this is on a base 96 inches in diameter. This saves floor space.

Oil mist lubricates the milling and multi-spindle heads.

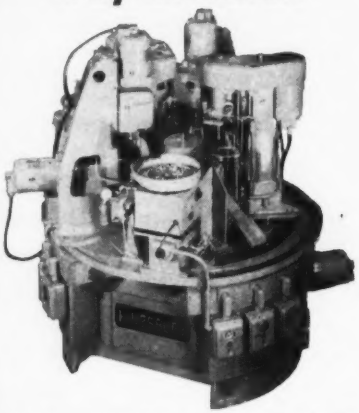
The customer returned his base, index unit and operating units to us for retooling. That was a real saving. And he has the Kingsbury assurance of good basic design, rugged, accurate construction, and test runs before shipment.

For high production at low cost, ask to have our representative call and talk over your jobs. Let him get you a specific proposal. Kingsbury Machine Tool Corp., Keene, New Hampshire.

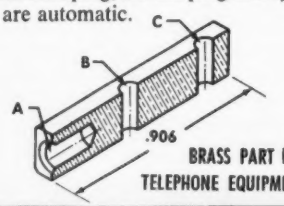
KINGSBURY

MULTI-UNIT AUTOMATICS

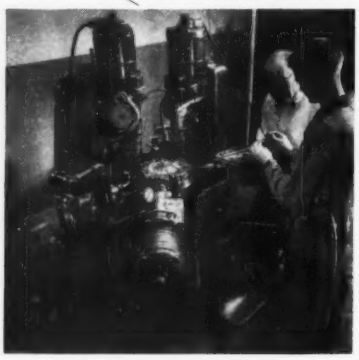
High production in minimum space — fully automatic



Gross production for this 8-spindle Kingsbury is 1,400 parts per hour for drilling the three holes, countersinking A and burring B and C top and bottom. Parts are fed from the hopper via a chute to an air-operated loading mechanism. Clamping, unclamping and ejection are automatic.



BRASS PART FOR TELEPHONE EQUIPMENT



1,000,000 cycles a year for 30 years with no serviceman

In November, 1929 Shakespeare Co. of Kalamazoo, Mich. set up this Kingsbury with their fixtures. It drills five holes and reams two in a part used in fishing tackle. Net production rate is 600 parts per hour.

Vice-President Earl Clickner (behind the operator) says, "We have never had to call a serviceman on it. We have run it for thirty years — about a million cycles a year — and it still gives us almost no trouble."

Fabricators Intensify Work On Missile Components

SPACE AGE metal requirements continue to spur new business for metalworking firms.

• **Mallory-Sharon Metals Corp.**—The company has a 1 million lb order for the vacuum remelting of special alloy steel for use in missiles. The steel is being reprocessed in special melting furnaces at Niles, Ohio, to eliminate all contaminants and to improve mechanical properties.

Two sizes of ingots are being poured: 24 in., weighing about 9500 lb each; and 30 in., weighing 15,400 lb. Forgings will be made directly from the ingots for the ring casings on a new long range missile.

• **Astrometals Corp.**—This firm is rushing to completion specially designed facilities for the precision machining and fabrication of beryllium metal into experimental missile components.

The new plant, at Hawthorne, N. J., is required for space vehicle research and development projects being conducted for the National Aeronautics & Space Administration, Washington. Astrometal's objective will be to develop techniques for joining and fabricating advanced missile and space vehicle components. Under a previous contract, the company developed a practical method of fabricating molybdenum metal sandwich structures by resistance welding, regarded as a major advance in missile metallurgy.

J&L Starts Big Project

First step in Jones & Laughlin Steel Corp.'s cost reduction and modernization program at its Cleveland Works has been taken. The $50 million program (STEEL, Aug. 31, p. 58) will include construction of two basic oxygen steelmaking furnaces.

Harris Construction Co., Cleveland, is dismantling three unused coke batteries with a total of 108 ovens. A large blast furnace will be constructed on the site.

Contracts for electrostatic precipitators on the basic oxygen furnaces and the three 220 ton open hearth furnaces which will remain in operation have been awarded to Western Precipitators Div., Joy Mfg. Co., Pittsburgh.

Koppers Co., Pittsburgh, is the prime contractor for the basic oxygen furnaces which are expected to go into production in the latter part of 1961. Steel from these furnaces will be used in the production of hot and cold rolled sheets and plates.

Will Expand Steel Mill

Interprovincial Steel Corp. Ltd., Regina, Sask., has launched a $1.3 million expansion program. A third electric furnace will be installed and the plate mill will be modified to permit rolling of wider steel. The new furnace is expected to increase the mill's annual capacity to 150,000 tons of finished products. The decision to expand was based on plans to construct gas trunk and transmission lines in Alberta during the next few years.

Modernizes Foundry

A foundry modernization program is underway at the West Allis (Wis.) Works of Allis-Chalmers Mfg. Co., Milwaukee. The project involves the transfer of operation and equipment at No. 2 foundry to No. 1 foundry. Engineering and purchase of new equipment has begun. Largest expenditure for new equipment is for automatic molding, and for changes in the conveyor, cooling, and sand handling systems. Work is scheduled to be completed late next year.

Enters Prestressing Field

Bristol Steel & Iron Works Inc., Bristol, Va., acquired controlling interest in Leap Structural Concrete Inc., Atlanta, producer of prestressed concrete products for buildings and bridges. Plant facilities for Leap Structural are being constructed at Powder Springs, Ga. Officers of the new corporation are: President, H. H. Edwards; executive vice president and general manager, J. W. Thompson; vice president, J. G. Tilley Jr.; treasurer, O. L. Hurt; secretary, W. J. Tilley Jr.

Kahn & Co. Builds

Kahn & Co. Inc., Hartford, Conn., is building a plant in Wethersfield, Conn. The company makes hydraulic, pneumatic, and electronic test stands; all types of compressed gas dryers; and various controls and electronic measuring instruments.

Aluminum Inc. Organized

Aluminum Inc. has established a warehouse and office at 1520 S. Federal Highway, Ft. Lauderdale, Fla. The new firm will act as distributor of foundry alloys for Aluminium Ltd. Sales Inc. Charles V. Cooper is president.

Will Produce Wire Springs

Alco Products Inc., Schenectady, N. Y., is constructing a wire spring production facility at its plant in Chicago Heights, Ill. Cold wound springs from carbon and alloy spring steels will be produced in a new building which will contain 18,000 sq ft of manufacturing space and 4712 sq ft of office space. It will be operated as part of Alco's Spring & Forge Div.

Will Build R&D Center

Semiconductor Div., Minneapolis-Honeywell Regulator Co., Minneapolis, will construct a $1 million Research & Development Center at Riviera Beach, Fla. The 40,000 sq ft facility will also be equipped for pilot production of newly developed products.

Armaments Firm Expands

Aircraft Armaments Inc., Cockeysville, Md., is constructing a 29,000 sq ft addition to its main plant in that city. The company is a subsidiary of United Industrial Corp., Grand Rapids, Mich. The firm is engaged in a wide range of engineering and manufacturing activities under contracts with the De-

partment of Defense and government agencies.

ASSOCIATIONS

Steel Service Center Institute is the new name adopted by the American Steel Warehouse Association, Cleveland. The new name reflects more accurately the functional scope and technical competence of the industry, says Robert G. Welch, executive vice president. An estimated 20 per cent of total steel production reaches the ultimate consumer through steel service centers compared with 10 per cent 30 years ago, he adds. In recent years, the volume of steel shipped by service centers to users has averaged more than 14 million tons annually.

National Association of Secondary Material Industries Inc. will be the new name for the National Association of Waste Material Dealers Inc., New York, effective June 1, 1960.

National Association of Aluminum Distributors, Philadelphia, elected these officers: President, C. C. Carmichael, Copper & Brass Sales Inc., Detroit; first vice president, Alfred Fortier, Reynolds Aluminum Supply Co., Los Angeles; second vice president, M. B. Marsh, Marsh Steel & Aluminum Co., Kansas City, Mo.; and treasurer, Andrew P. Barton, Mutual Mfg. & Supply Co., Cincinnati. Thomas A. Fernley Jr. is advisory secretary; R. Bruce Wall, secretary.

Metal Treating Institute, New Rochelle, N. Y., elected these officers: President, C. R. Weir, Commonwealth Industries Inc., Detroit; vice president, J. H. Ries, Lakeside Steel Improvement Co., Cleveland; and treasurer, L. G. Field, Greenman Steel Treating Co., Worcester, Mass. C. E. Herington is executive secretary.

National Electrical Manufacturers Association, New York, elected these officers: President, N. J. MacDonald, Thomas & Betts Co., Elizabeth, N. J.; vice president, W. C. Wichman, Hotpoint Div., General Electric Co., Chicago; and treasurer, A. D. R. Fraser, Rome Cable Corp., Rome, N. Y. J. M. Gleeson, Picker X-Ray Corp., White Plains, N. Y., is chairman of the X-Ray Section; T. H. Vatz, Profexray Inc., Maywood, Ill., vice chairman. A. A. Snowball, Pittsburgh Standard Conduit Co., Pittsburgh, is chairman of the Rigid Steel Conduit & Electrical Metallic Tubing Section; J. H. Collier, Steelduct Co., Youngstown, is vice chairman.

CONSOLIDATIONS

Dow Chemical Co., Midland, Mich., purchased **Sequoia Metalcraft Co. Inc.,** a magnesium foundry in San Carlos, Calif. Dow will operate it as a subsidiary.

Chromalloy Corp., New York, acquired **Sintercast Corp. of America,** Yonkers, N. Y., producer of patented tool materials; boron, tungsten, and titanium compounds; and nuclear reactor metals. Chromalloy will operate the property as its Sintercast Div.

Crane Co., Chicago, acquired **Pipe Fabricators Inc.,** East Chicago, Ind., and Canadian Pittsburgh Piping Ltd., Hamilton, Ont. Crane Co.'s pipe fabricating departments at Chicago and Birmingham will be transferred soon to East Chicago. All of Crane's domestic and Canadian fabrication of pipe for utilities and chemical plants and special fabricated valves will be concentrated eventually at the Hamilton and East Chicago plants. The East Chicago plant will be operated as the Pipe Fabricating Div. The Canadian firm becomes a subsidiary of Crane Ltd. under the name of Crane Piping Ltd.

Textron Inc., New York, acquired **Amsler Morton Corp.,** Pittsburgh, its American affiliates, and Amsler Morton's interest in its Canadian associates. Amsler Morton specializes in the design and construction of industrial furnaces for the heating and melting of steel.

American Buff Co., Chicago, manufacturer of buffs and polishing wheels, purchased **J. J. Siefen Co.,** Detroit, producer of buffing compounds and spray equipment for the metal finishing industry. Siefen will continue to operate as a separate enterprise.

A group of four construction firms (**Kaiser Engineers Div., Henry J. Kaiser Co.,** Oakland, Calif.; **Morrison-Knudsen Co.,** Boise, Idaho; **Macco Corp.,** Los Angeles; and **F. E. Young Construction Co.,** San Diego, Calif.) plans to acquire **National Steel & Shipbuilding Corp.,** San Diego. If approved by stockholders, the sale will be effective Jan. 4, 1960.

Merger discussions between **Hiller Aircraft Corp.,** Palo Alto, Calif., and **Twin Coach Co.,** Buffalo, have been discontinued.

NEW PLANTS

Arthur Colton Co., a division of Snyder Corp., Detroit, completed construction of a plant in Elk Rapids, Mich., for the production of punches and dies.

Clark Equipment International CA, a subsidiary of Clark Equipment Co., Buchanan, Mich., opened a plant at Valinhos, Brazil, for the production of automotive transmissions, differentials, gears, and other components for South American built products of Clark and other firms. Cost: $4.5 million.

Perfect Circle Corp., Hagerstown, Ind., plans to build a $3 million piston ring foundry near Rushville, Ind. The 80,000 sq ft plant will have three times the capacity of the firm's present foundry at Rushville. Perfect Circle also operates a foundry at New Castle, Ind.

An oxygen producing plant built at the Coatesville, Pa., Works of Lukens Steel Co. is now on stream, reports **Linde Co.,** a division of Union Carbide Corp., New York. Capacity: 110 tons a day of high purity oxygen.

Air Reduction Sales Co., a division of Air Reduction Co. Inc., New York, is constructing an air separation plant at Baton Rouge, La. The $2 million plant will have a capacity of 30 tons a day of liquid oxygen, nitrogen, and argon.

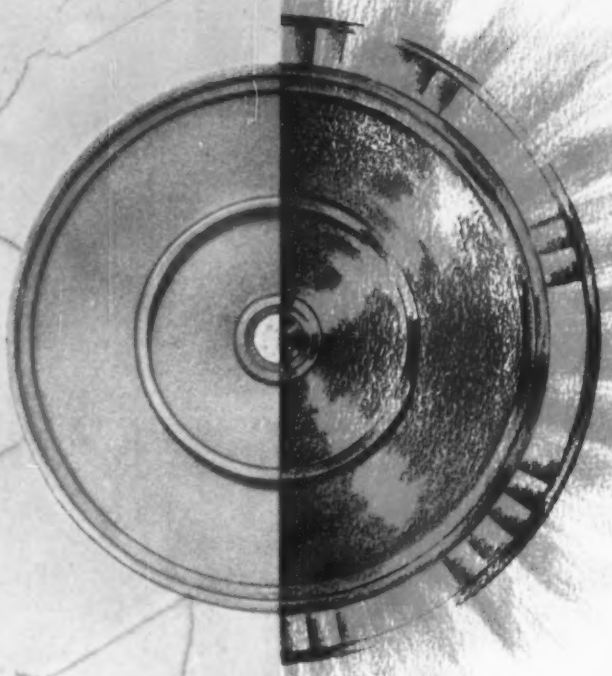
YOU GIVE YOUR DESIGN A LONGER LIFE WHEN YOUR "SPECS" READ HYATT

If you want smooth, trouble-free operation for the life of your design, you can have it with Hyatt! For Hyatt's built-in quality is electronically controlled to insure that the last Hyatt Hy-Roll bearing is just as accurate as the first. Hyatt reliability costs no more so why not have the best? Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

Replacement bearings available through United Motors System and its authorized bearing distributors.

HYATT *HY-ROLL BEARINGS*

IN ROLLER BEARINGS HYATT IS THE WORD FOR GM RELIABILITY



NICKEL BASE ALLOY FORGINGS

WITH

GUARANTEED PROPERTIES

FOR

IMPROVEMENTS IN

- weight
- reliability
- performance

can be accomplished with WYMAN-GORDON forgings. Optimum metallurgical practice and quality control provide higher property levels and reduced variation within and between forgings to permit generally the following GUARANTEED MINIMUM mechanical properties for contoured wheels and discs up to 50 inches in diameter.

RENÉ 41*

Typical Mechanical Properties

TENSILE PROPERTIES:	Room Temp.	1400° F
Ultimate Strength, psi	200,000	145,000
.2% Yield Strength, psi	150,000	125,000
.02% Yield Strength, psi	135,000	110,000
Elongation (% in 2")	15	18
Reduction in Area, %	18	20

STRESS RUPTURE:	Combination Smooth and Notch Bar	Smooth Bar
Temperature, ° F	1350	1650
Stress, psi	85,000	25,000
Life, Hours	100	50
Elongation, %	12	12
Reduction in Area, %	14	14

Guaranteed Minimum Mechanical Properties

TENSILE PROPERTIES:	Room Temp.	1400° F
Ultimate Strength, psi	180,000	135,000
.2% Yield Strength, psi	132,000	115,000
.02% Yield Strength, psi	120,000	100,000
Elongation (% in 2")	12	13
Reduction in Area, %	14	18

STRESS RUPTURE:	Combination Smooth and Notch Bar	Smooth Bar
Temperature, ° F	1350	1650
Stress, psi	85,000	25,000
Life, Hours	40	25
Elongation, %	8	10
Reduction in Area, %	10	12

*RENÉ 41: GENERAL ELECTRIC COMPANY

EST. 1883

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FORGINGS

of Aluminum Magnesium Steel Titanium . . . and Beryllium Molybdenum Columbium and other uncommon materials

HARVEY ILLINOIS — WORCESTER MASSACHUSETTS — DETROIT MICHIGAN

GRAFTON MASSACHUSETTS — FRANKLIN PARK ILLINOIS — LOS ANGELES CALIFORNIA — FORT WORTH TEXAS

Technical Outlook

UPPING FORGING SPEED—Rough cast blanks for forging drastically reduce the number of press operations needed without sacrificing quality, H. J. Wagner, Battelle Memorial Institute, and J. W. Spretnak, Ohio State University, report. Their conclusions are based on upset forging to height ratios between 1:4 and 2:1. The material: SAE 4340 steel. Other steels are being considered.

AUSTENITE ROLE DEFINED—Tests of SAE 52100 show that appreciable amounts of retained austenite contribute to dimensional instability, the degree depending on temperature and stress. The solution: Austempering, which produces a structure about as stable as that of high temperature tempering but has the additional advantage of minimizing quench cracking.

FORESEES BETTER HOT REACTOR—The nuclear propulsion system of tomorrow's merchant ship will be helium cooled, operate at 1500° F, and have efficiencies above 40 per cent, says H. L. Browne, deputy project manager, General Atomic Div., General Dynamics Corp., San Diego, Calif. The system will have beryllium in its core.

IMPROVED ANODE MATERIAL—Titanium plated with 0.0001 in. of platinum acts like solid platinum and outlasts many other types of electrochemical anodes, states Crucible Steel Co. of America, Pittsburgh. Anticipated uses: Cathodic protection, electroplating, and control devices.

FLAT STAINLESS WIRE—Made from 17-7 PH stainless, the shape has greater dimensional stability than round music or spring wires, claims National-Standard Co., Niles, Mich. Typical applications: Hair clip springs, electrical timer springs, and sprinkler assembly clips.

YTTRIUM UPGRADES STEEL—The rare metal yttrium "spectacularly" upgrades steel alloys, General Electric scientists say. The biggest gain: A 25 per cent improvement in oxidation resistance of chromium alloys. It is also five times more effective than aluminum in improving oxidation resistance of iron-chromium base metals. The rare earth blocks entry of nitrogen and oxygen.

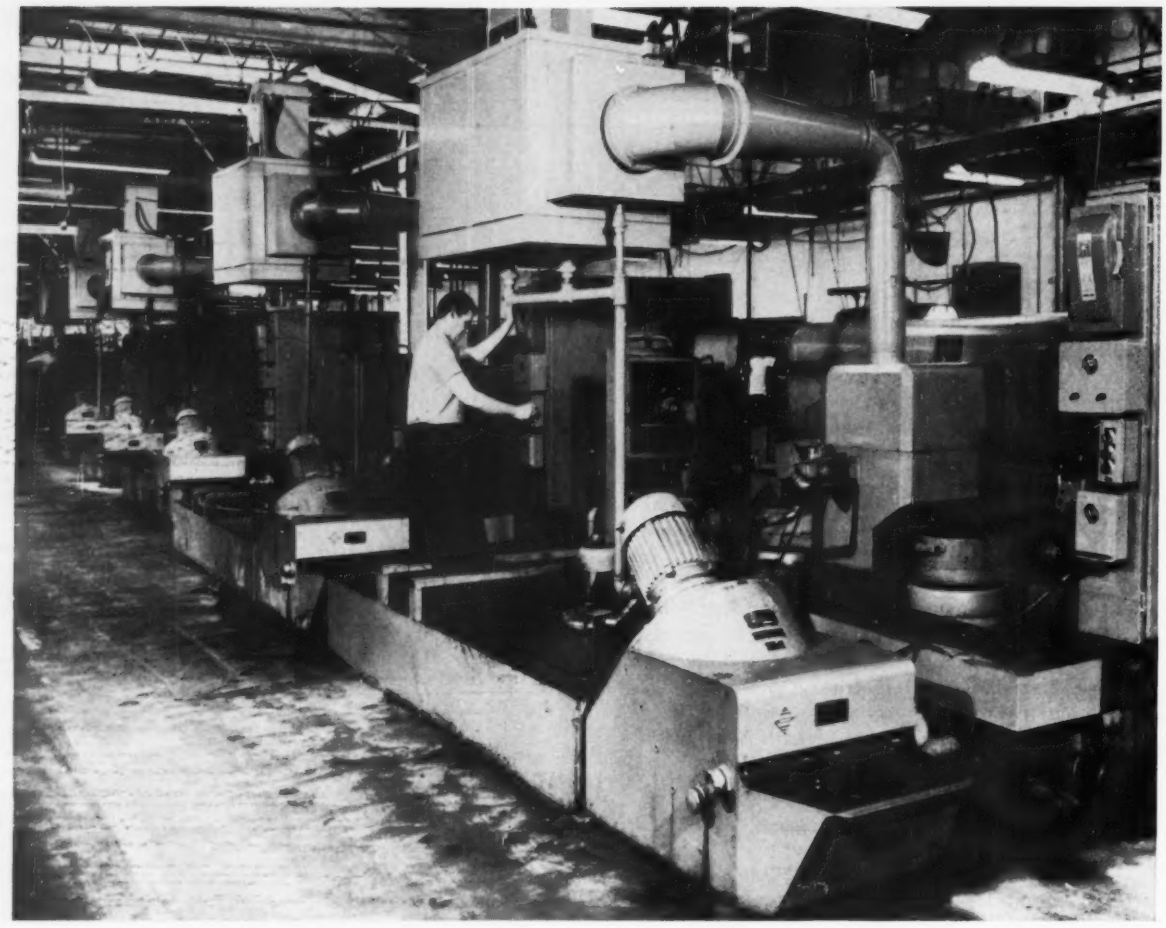
PUSH SCRAP QUALITY—Scrap people and steel producers are backing an investigation to find ways of analyzing and upgrading scrap quality and yield. A 5 per cent improvement could save $15 million annually. An unsolved quality problem could restrict scrap dealers' markets, says Battelle Memorial Institute, Columbus, Ohio—it's doing the research.

SHOWS BRIGHT COPPER PLATE—A new bright copper cyanide process offers these advantages, says Hanson-Van Winkle-Munning Co., Matawan, N. J.: Deposits are smooth and bright over an exceptionally wide range of temperatures and current densities; metal distribution is good; the solution is easily controlled; and the finish can be buffed.

PREVENTS SCALE—"Skalix" scale preventive is a good substitute for an inert gas atmosphere in heat treating, says H. A. Storms, chief engineer, Los Angeles Div., North American Aviation Inc. The material is sprayed (or dipped) on metal parts. It forms an oxygentight seal that pops off as the metal cools.

ALUMINUM'S TIN OVERCOAT—A compound for the makeup and maintenance of stannate-type tin baths produces a smooth, adherent coating on aluminum parts in 4 minutes at 165° F. Coated auto pistons and transmission components are said to last longer.

ALUMINUM'S SILVER OVERCOAT—A simple, three-step process silver plates aluminum bus bars, says Allis-Chalmers Mfg. Co., Milwaukee. An alkaline dip and a new mercuric compound bath, precede plating, cutting plating time and the amount of silver used, the firm claims.



Compact clarifiers can be placed near grinders on the production line. Previous setup for one machine was 20 ft high, took 100 sq ft of floor space

Better Coolant Clarifier Upgrades Turbine Blades

Centrifugal units leave less abrasive in the coolant, prevent scratches on parts. They're smaller, cost less, and can be cleaned faster than the previous setup

MACHINE shops need the best clarification equipment they can get when customer specifications demand fine finishes and economy dictates extended coolant life.

One modern coolant clarifier, a high capacity, centrifugal unit, made abrasive removal 39 per cent more efficient at the Stratford, Conn., plant of Lycoming Div., Avco Corp. The cleaner, called TurboMatic, was supplied by DeLaval Separator Co., Poughkeepsie, N. Y.

• The units take less space, cost less, and they're easier to clean than the filter system the company previously used.

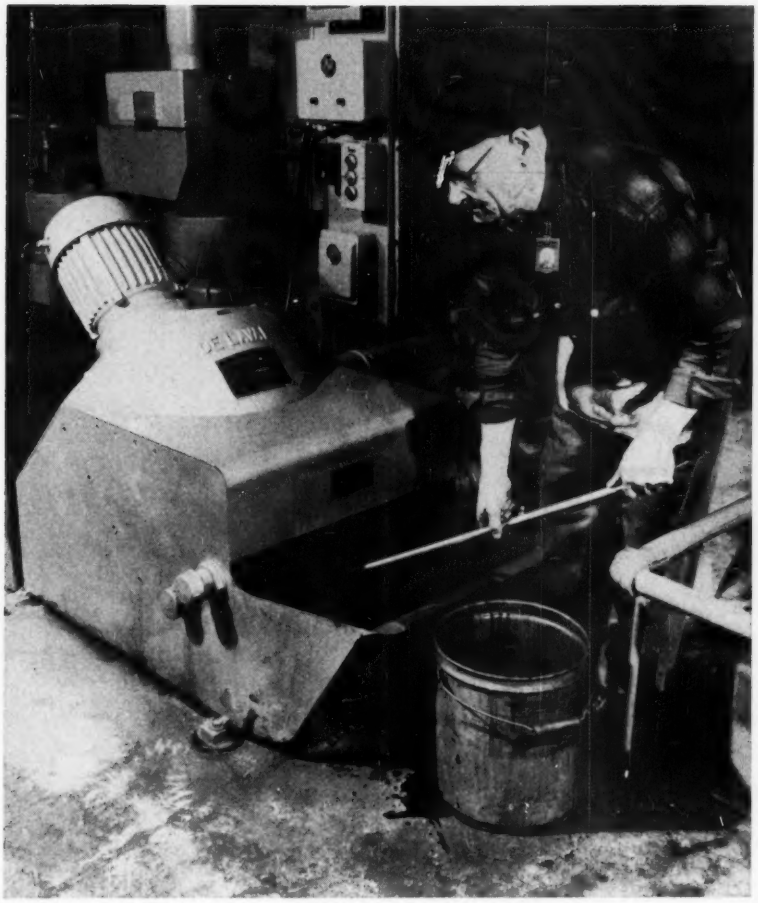
The centrifugal unit is about 3 ft wide, 4 ft long, and 3 ft high. The filter system it replaced was 20 ft high and required 100 sq ft of floor area. The clarifier costs $200 vs. $5000 for the filter setup.

Sludge is removed from the clarifier once a week. Time required: About a minute. The filter system was cleaned once a month, but the job took 16 manhours. Filter paper, at $3.25 a roll, had to be replaced every three weeks.

• Abrasive particles are separated from the coolant by centrifugal force and dumped into a sump at the bottom of the machine.

Nested, conical laminations in the centrifuge divide coolant into many thin layers, making for more effective abrasive removal.

Extracted solids are purged twice a shift from the centrifuge bowl by reversing current and stopping the machine in 8 to 10 seconds. Rapid braking and the 45 degree angle of the bowl cause sludge to fall into a sump at the bottom of the machine. No mechanical scraping is necessary.



Sludge is raked from the sump once a week. The job takes only a minute. Cleaning formerly required 16 manhours a month

The clarifier has coolant inlet and outlet connections on both sides, so it can be used in multiple installations.

• The machine is used at Lycoming to clean coolant used in grinding jet engine turbine blades.

Blades are made from Type 403 (nonmagnetic) stainless steel and must get a first class finish. (Tolerance: 0.0005 in.) Excello grinders coupled to the clarifier remove 0.030 to 0.96 in. of stock from the blades, taking off as much as 0.002 in. in the roughing pass. Nominal coolant flow in the grinders is 40 gallons per minute.

The company found that abrasive material, left in the recirculated coolant after filtering by the previous method, caused scratches on the blades. Some abrasive particles were too small to be removed by filtering. And tests showed that filters were removing only 60 per cent of filterable material.

• The company tried one of the centrifugal units, liked the results, and installed four more.

One of the clarifiers, installed as a test model, operated at 99 per cent efficiency. It removed micron size contaminants, as well as larger particles. All scratches on turbine blades have been eliminated because the recirculated coolant is cleaner, says E. J. Seitz, lubrication engineer. Success with the test model prompted the company to install four more of the clarifiers on the production line.

Previously, abrasive material remaining in the coolant caused excessive wear in the recirculating pumps. They had to be repaired every six to eight weeks. No repairs have been necessary since the clarifiers were installed.

Centrifugal Compressor Supplies Industrial Air

A new line of multistage, centrifugal air compressors (1000 to 8000 bhp) has been developed by Clark Bros. Co., Olean, N. Y., one of the Dresser Industries, to supply 100 psi air for industrial applications. Eleven of the units have been ordered for use in five steel mill oxygen plants and a western wind tunnel installation.

Six sizes are available. They'll supply air at 5000 to 38,000 cfm.

Intercoolers between compression stages insure maximum efficiency. Single case construction and base mounting of the intercoolers reduces floor space requirements up to 40 per cent. Centrifugal design insures steady air flow, eliminating the need for large storage containers; it also reduces vibration, making large foundation blocks unnecessary.

Hoods Take Scarfing Smoke

Hoods developed by company personnel dispose of smoke and dirt in the bloom conditioning department at the Steel & Tube Div. of Timken Roller Bearing Co., Canton, Ohio.

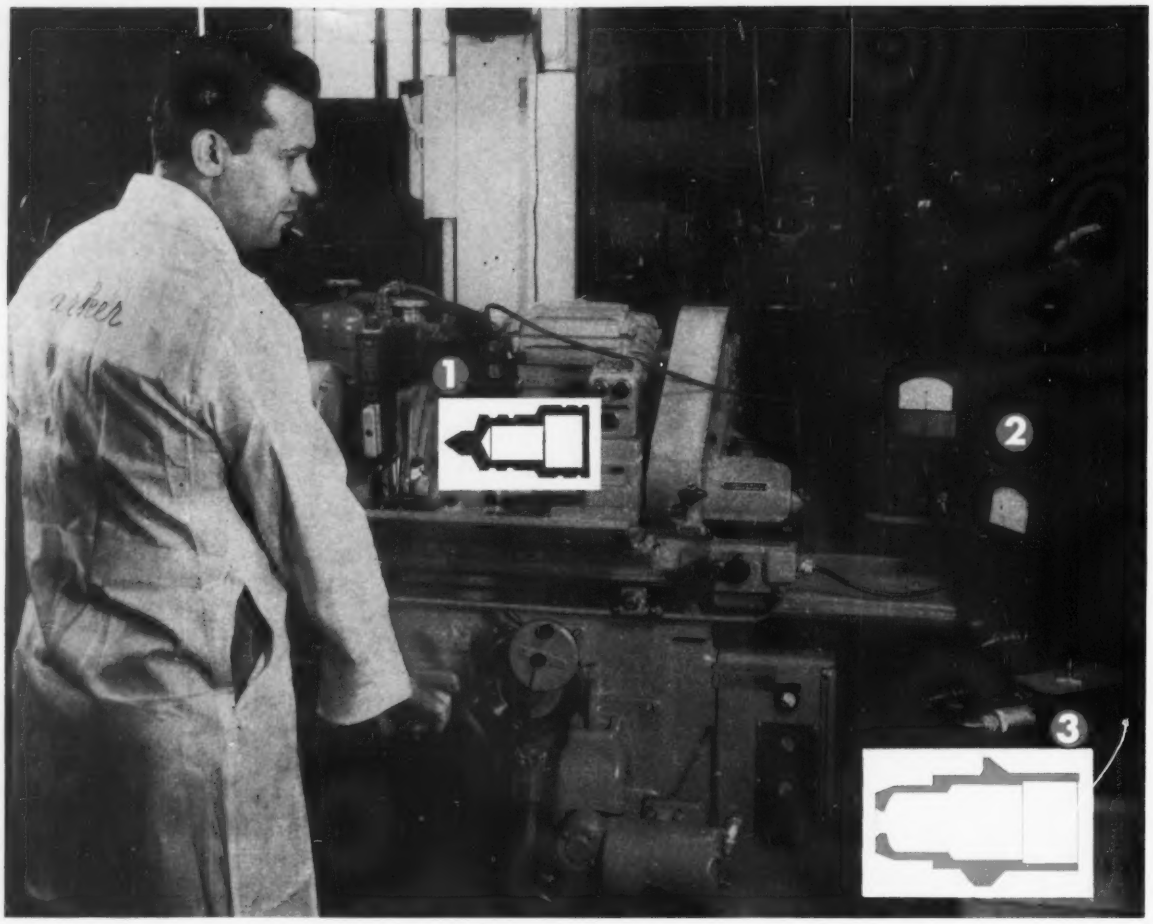
A rounded metal shield covers blooms at each hot scarfing station without interfering with the scarfer's work. A 40,000 cfm exhaust fan draws air through the hood, carrying smoke and dirt into a central collection system.

The scarfer can raise and lower the hood in seconds with a cable and drum system that's powered by an electric motor. That permits feed racks to be stocked with a lift truck.

Cold Forming Trims Costs

Cold forming lowered costs about 85 per cent in the production of a small stainless steel fluted pin at John Hassall Inc., Westbury, N. Y. As originally made, the pins cost $19.20 per thousand. With cold forming, the cost is around $2.95 per thousand.

The part also has greater strength, smooth rounded corners without burrs, and closer dimensional tolerances.



Caliper gage (1) sends outside diameter reading from poppet being ground to a computer-amplifier (2) that compares it with a poppet liner inside diameter reading from the bore gage (3). Meter reads zero when the poppet is ground to size

Jet Engine Parts Upgraded By Grinding-Gaging Setup

Crossfeed is derived from controlled distortion of the machine casting; and gages measure millionths. The system makes precision grinding routine

PRECISION often gets the nod over productivity when builders of aircraft and missile components invest in new machine tools.

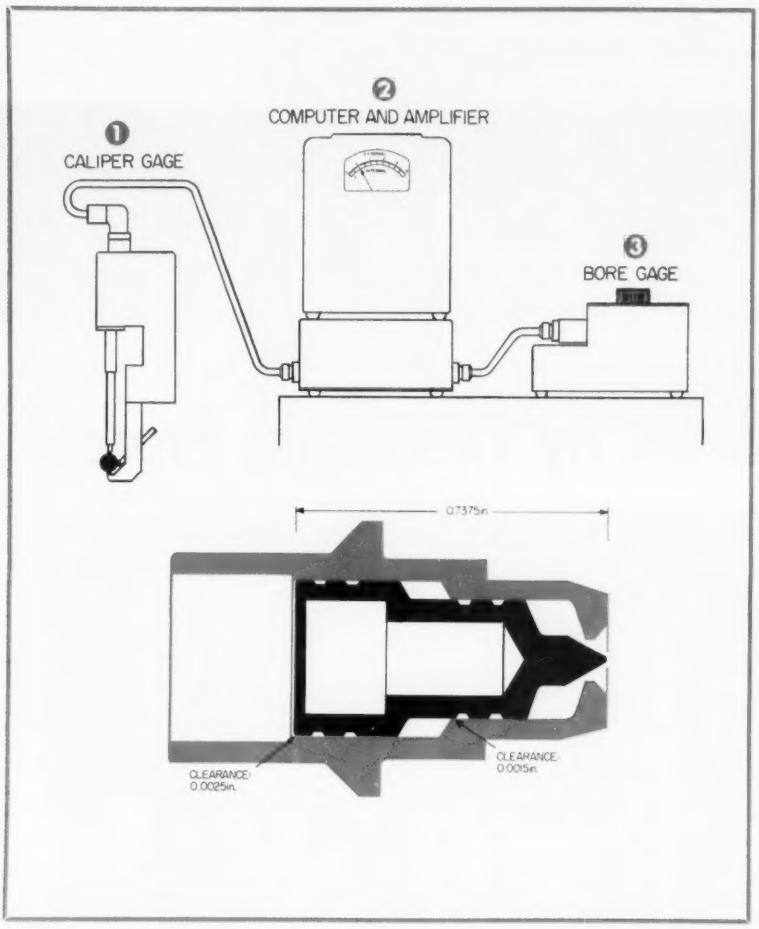
A plain grinding machine, with ultrafine crossfeed and a gaging system that measures millionths, produces parts to extremely close tolerances at the Engine Accessories Div., Parker-Hannifin Corp., Cleveland. The machine and accessories (see STEEL, May 19, 1958, p. 148) were supplied by Brown & Sharpe Mfg. Co., Providence, R. I. The company upgraded its products with the grinding-gaging system.

Production runs aren't common at the division, says Ned H. Shiflett, plant manager. It designs and produces precision valves and other parts for jet aircraft engines; all parts are made to customer specifications.

• Capital investment was reasonable, and operators didn't need extensive training.

The new machining setup was installed for about $28,000. Here's an example of how it helps the company make better parts: A poppet and liner subassembly for a jet engine fuel nozzle has a nominal operating clearance of 0.0025 in. A tolerance of +0.0004, −0.0001 in. was hard to meet by previous machining methods. Now a tolerance of ±0.000020 in. is routine.

Operators turned out precision work on the machine after a minimum of training, C. J. Herke, general foreman, reports. A Brown &



An outside diameter is gaged by an electronic caliper. It's ground to about 50 millionths oversize in a conventional manner. The workpiece turns at about 500 rpm; and the grinding wheel travels at about 1770 rpm. Reciprocation of the wheel spindle for plunge grinding helps maintain a 3 to 5 rms surface finish. The wheel moves $\frac{1}{8}$ in. laterally, 37 to 43 times a minute. Ceda Size (a controlled elastic deformation arrangement) is then used for finish grinding.

• One of the operators says the fine finishing method is much like an old shop practice of "leaning on the machine."

A load, applied to the machine casting, distorts it and provides an extremely slow crossfeed. A meter connected to the caliper circuit reads zero when the dimension is to its specified value.

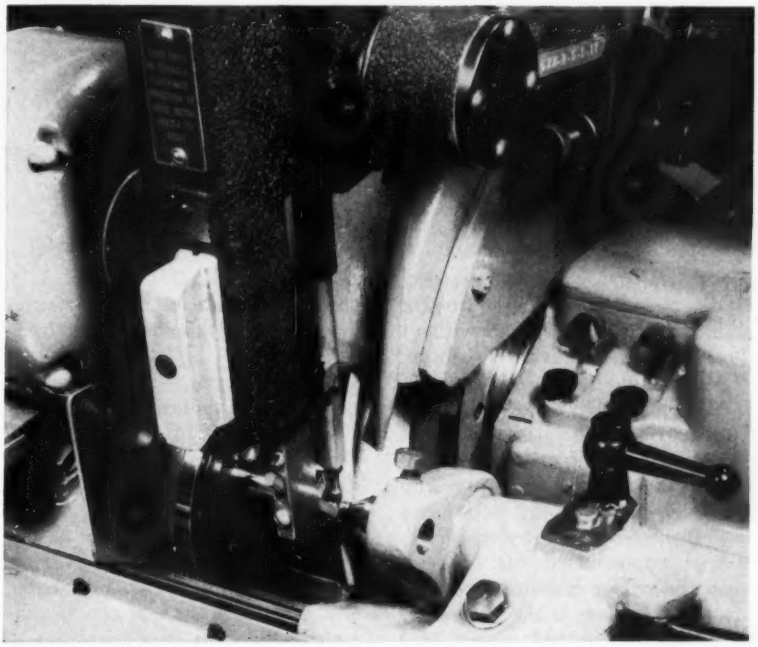
Ceda Size is used with a gage-computer setup, called Electromate, to grind outside diameters so they'll match finished bores. A computer receives signals from the outside diameter caliper gage and from another gage that measures the bore to be matched. A zero reading on the gage meter indicates mating of the outside diameter and bore to the preset clearance.

Sharpe representative demonstrated the machine on the job for a week. Mr. Herke and one of his lead operators later had a week of orientation and training at the Brown & Sharpe plant.

• A semiskilled operator, using the setup, grinds outside diameters to meet tight specifications, or to fit mating bores.

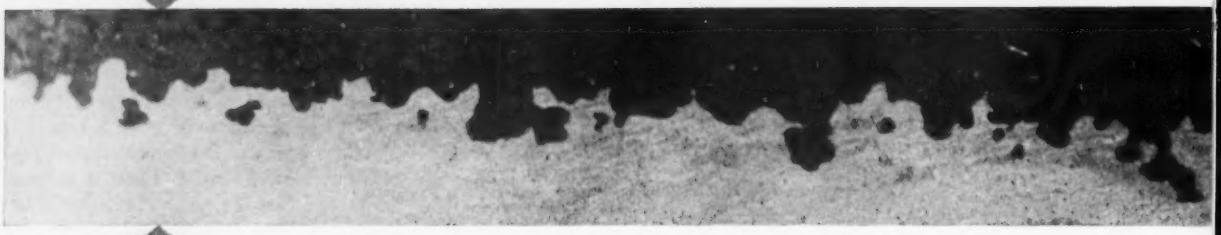
The system can plunge grind parts to ±0.000010, or match outside diameters with mating holes, to a tolerance of ±0.000020. It can also fit or finish parts, removing as little as 0.000010 of stock.

A strain gage alignment setup, called Electralign, helps control taper, and tempered spring isolation mountings absorb outside vibrations. Coolant is filtered and kept at room temperature to insure accuracy in measurements.

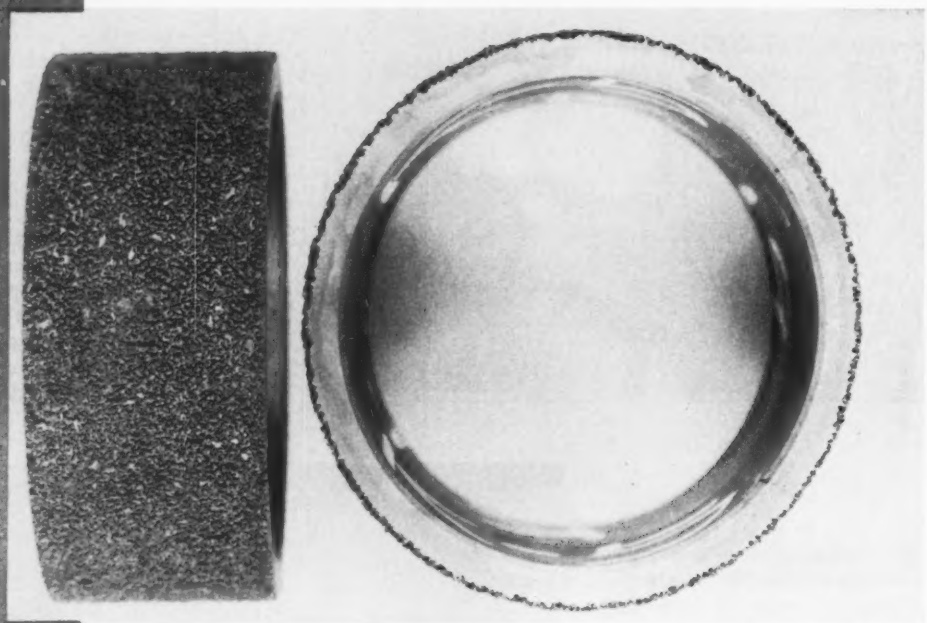


Electronic comparator caliper gage, riding on the workpiece as it's ground to size, provides continuous measurement of outside diameter

Cast Iron . . .



Aluminum Bonded by Diecasting Process



Rough surface after cleaning, reason for the interlock joint, shows on test insert

NOW you can bond cast iron to aluminum via diecasting without fluxes or precoating with aluminum. The technique was developed by Doehler-Jarvis Div., National Lead Co., Toledo, Ohio.

The pressure exerted in diecasting is used to force the aluminum into the rough surface of cast iron, forming a mechanical interlock.

Applications include cast iron cylinder liners for aluminum engine blocks, cast iron brake liners for aluminum drums and wheels, and aluminum cooling fins on cast iron piston sleeves. The technique is expected to eliminate design restrictions on aluminum-cast iron combinations.

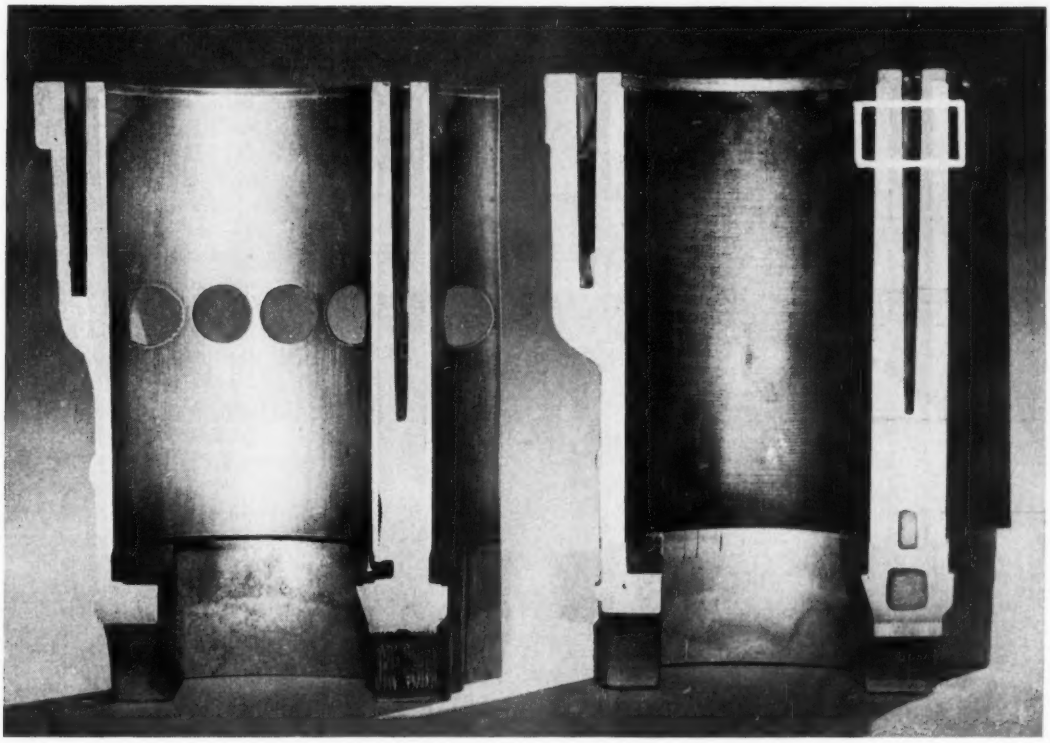
Doehler-Jarvis lists these advantages of the method:

1. The bond requires no machining or other processing other than cleaning of the casting. (Ends are machined to fit the pressure diecasting molds in the case of cylinders.)
2. The joint is strong and ductile.
3. Combined stresses can be tolerated—the joint is not sensitive to direction of load application.
4. Temperature differences, even cyclic temperature changes, do not cause the bond to separate.
5. Heat transfer properties of the joint are excellent.

• Previous methods involved either a mechanical or a metallurgical bond. The surface to be bonded required machining.

Mechanical methods include such processes as crimping, knurling, spinning, and shrink fitting. They serve well for small inserts but are not as satisfactory for large sections, particularly where there are temperature changes in service. The

Bi-Metallic Interlock method produces good joints without fluxing or precoating with aluminum. It takes advantage of the surface roughness of centrifugally cast iron and the pressure of diecasting



Separation at joint shown on smooth insert; uniform contact with BMI sample

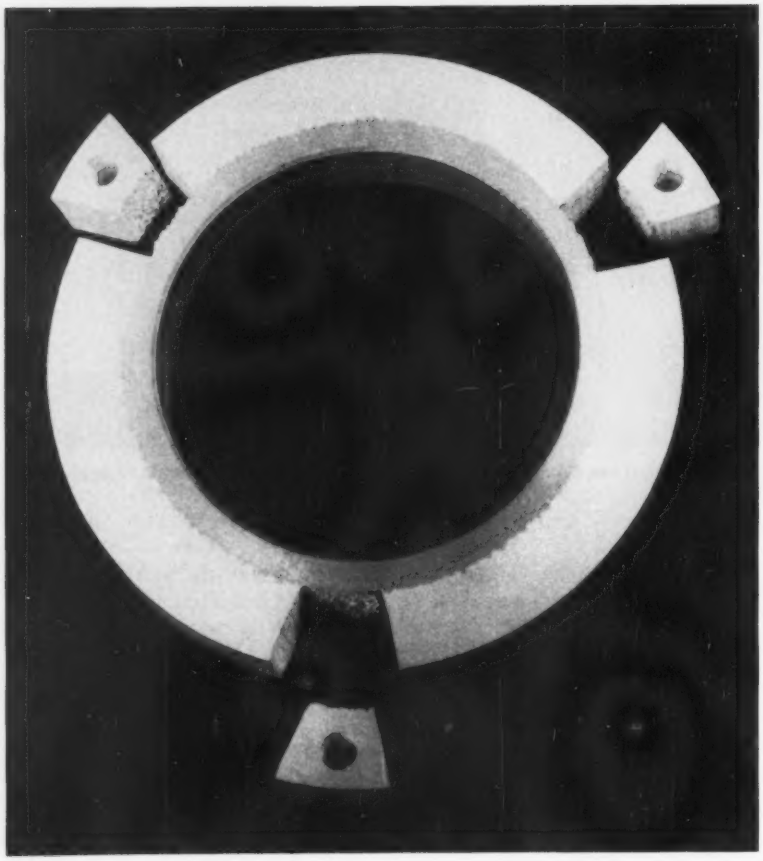
aluminum and cast iron have different size changes with temperature, which cause separation where the areas are large, or loosen a shrunk joint.

Good mechanical contact is important if heat is to be transferred across the bond, yet heat has a tendency to cause mechanical joints between iron and aluminum to open. The problem is particularly severe when the heating is cyclic in nature, says A. F. Bauer, assistant general manager and chief engineer, and J. S. Mikus, project engineer, Research & Development Dept. at Doehler-Jarvis.

A metallurgical or alloyed bond gives excellent contact. The steps involved, after machining, include cleaning, fluxing, and immersion in a bath of molten aluminum—time depends on the mass of the iron part and the thickness of the iron-aluminum alloy layer. Removed from the aluminum with a layer of molten metal, the part is placed in a mold, and aluminum is poured around it to provide the final configuration. In some cases, it is possible to use a molten type flux at a fairly high temperature, removing the iron part from the flux and casting the molten aluminum against the fluxed surface before it has lost much of its heat.

The metallurgical bond used for sand and permanent mold casting requires steps which make it diffi-

Specimen after shear test shows failure through aluminum outside bond area



Tension test specimen after pulling. Failure occurred in aluminum, not joint

cult to apply to diecast parts, especially on a production basis, Doehler-Jarvis comments.

• The new method takes advantage of the typical rough surface of centrifugally cast cylinder sleeves to form a mechanical bond with a minimum of surface preparation.

Messrs. Bauer and Mikus advocate simple cleaning of the castings, instead of tumbling or machining. Sandblasting has been used, as well as a salt bath; either method removes the mold coating on the as-cast parts and reveals a rough surface containing a multitude of tiny undercut areas and protrusions.

Without some type of fluxing, aluminum would not readily penetrate the crevices in static type casting procedures. At a metal temperature of 1200° F and the pressure used in the diecasting procedure (10,800 psi), the aluminum was forced into the surface irregularities and a firm bond was formed; the two metals interlock like a three-dimensional jig saw puzzle. The resultant joint contains little if any of the brittle iron-aluminum alloy; tests show it is both strong and ductile. It has been designated as the BMI (Bi-Metallic Interlock) bond. Many tests have been made to determine physical properties.

Mechanical tests showed that the BMI joint has high strength in tension and in shear. Tests were run on cylindrical specimens similar to a cross section of a cylinder liner.

In the shear tests, it was learned that interference fit joints had a strength dependent on the surface of the cast iron insert, rougher surfaces giving a higher shear strength—although the best value obtained was less than 10 per cent of the BMI strength; samples with a metallurgical bond, while good, were not as strong as the BMI specimens.

Tensile tests were made on a section of the bond prepared by making two radial cuts on the cylindrical specimen. Results showed the metallurgical bond to have superior strength.

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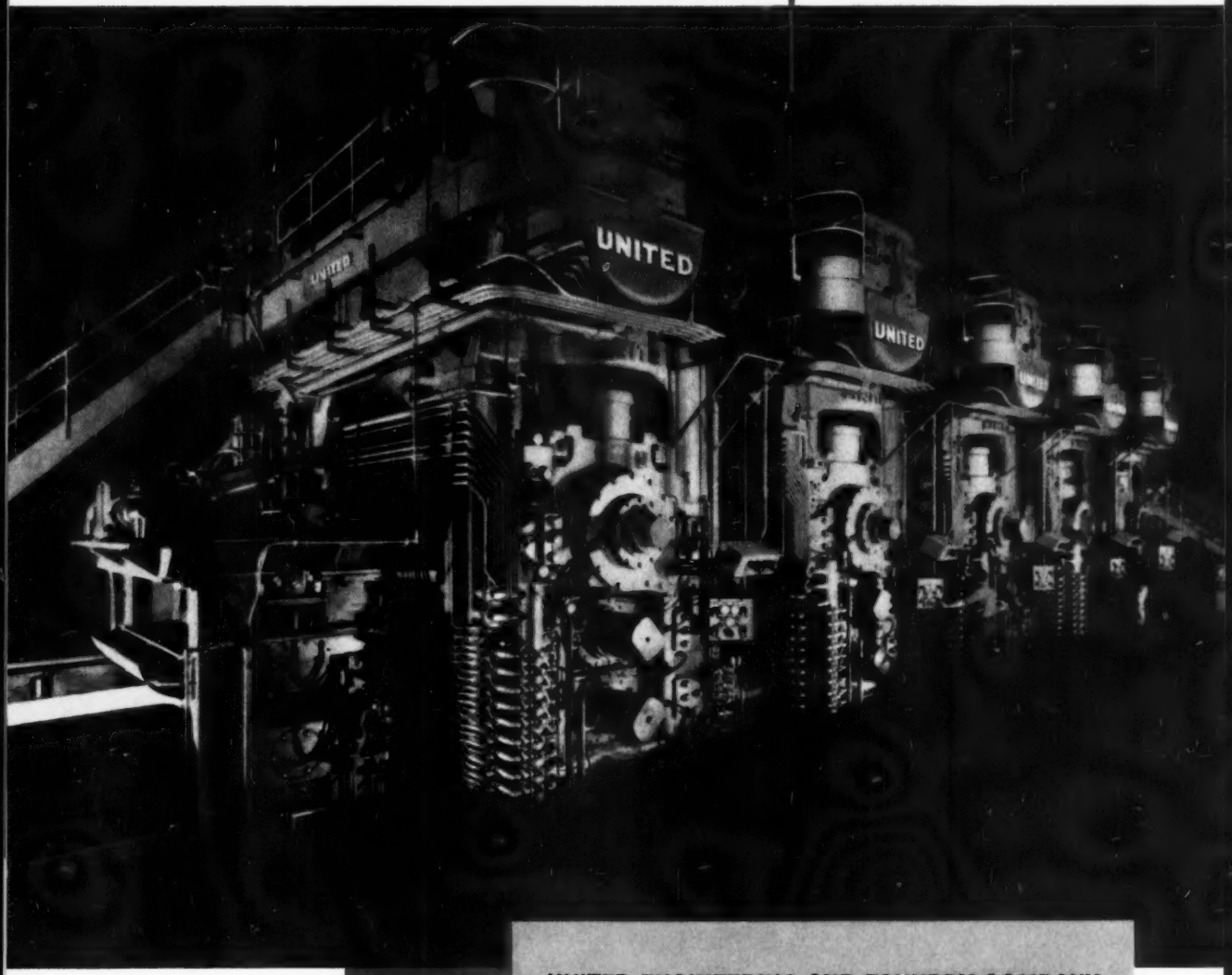

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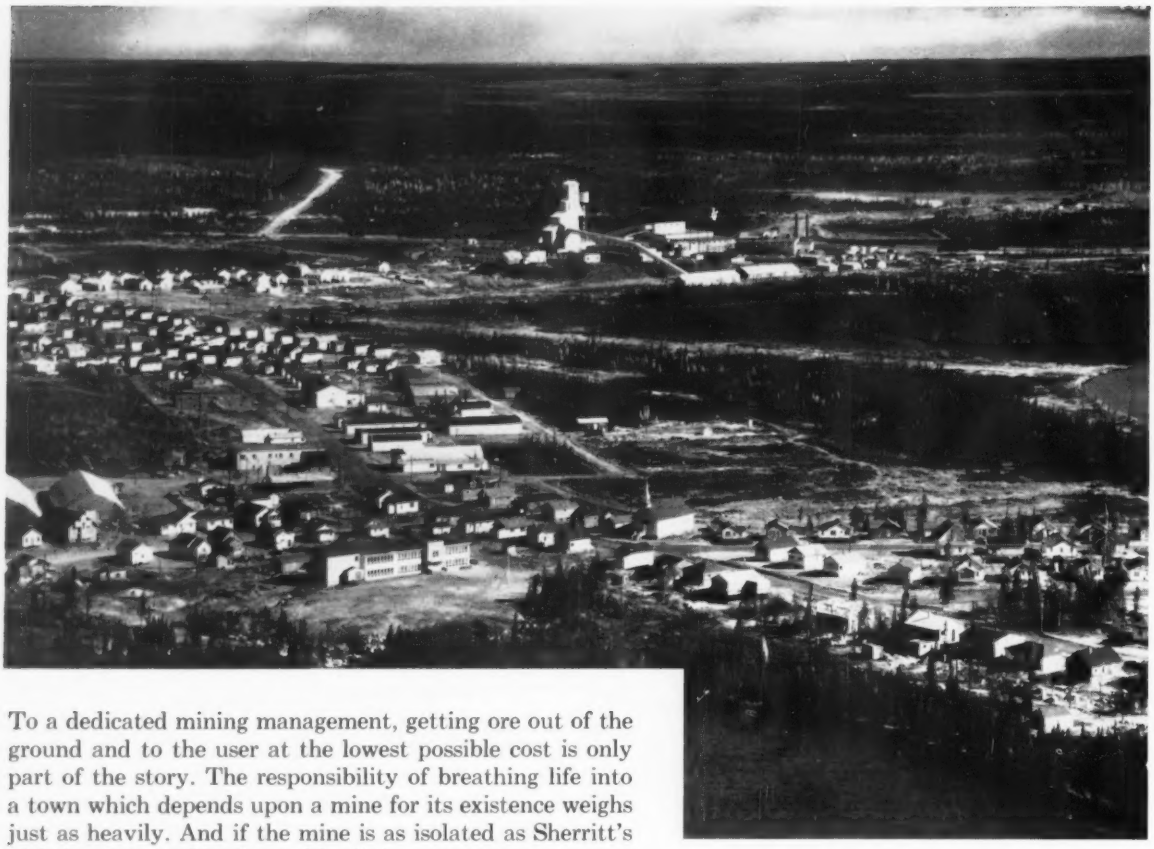


The Sherritt mines at Lynn Lake, Manitoba, yield a generous 2500 to 3500 tons of nickel-copper-cobalt ore per day.

To a dedicated mining management, getting ore out of the ground and to the user at the lowest possible cost is only part of the story. The responsibility of breathing life into a town which depends upon a mine for its existence weighs just as heavily. And if the mine is as isolated as Sherritt's nickel mine in Northern Manitoba, management must further provide all the tools the town needs to run itself happily . . . democratically . . . successfully.

Here at Lynn Lake a population of 2000 is supported by some 600 Sherritt people who work two nickel mines and a concentrating plant on a three-shift basis. But before this could be done, Sherritt had to move in all the facilities for an entire town . . . on tractor-pulled sleighs . . . over 165 miles of 20-degrees-below-zero wilderness. The great portage included 208 buildings—150 homes, a bank, a post office, a school, 2 churches—and a complete milling and concentrating plant. Two hydroelectric plants had to be built to provide power. And, later, a 150-mile railroad had to be built to handle the mines' output.

Today, Sherritt people at Lynn Lake turn out 2500 to 3500 tons of ore per day which is concentrated, then shipped to the company's refinery at Fort Saskatchewan 800 miles away. There it is refined to yield 35 tons of 99.8% pure nickel per day by people who also realize that getting the nickel out is only part of the job.

Getting the nickel out

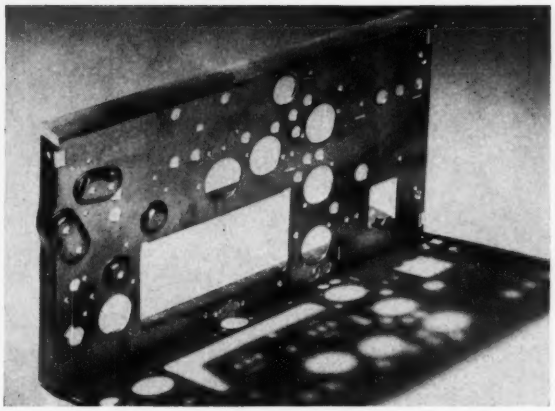
is only part of the job

SHERRITT

FOOTE MINERAL COMPANY is the exclusive sales agent for Sherritt nickel and cobalt in the United States and Canada. For product literature, prices, and delivery information, contact the Foote Mineral Company, 411S Eighteen West Chelten Building, Philadelphia 44, Pennsylvania.

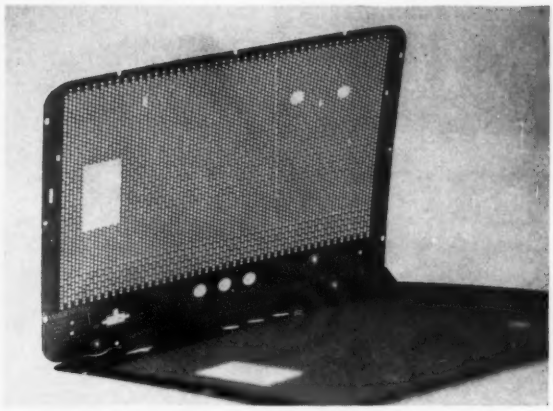
SHERRITT GORDON MINES LIMITED

Material Switch Saves on Stampings



$125,000 saved on plated parts

Chassis pans, plated after forming, cost 32 cents each. Made from terne plate they cost just over 21 cents. In two years, the company saved $55,000 on this part alone. (Savings on all steel stampings that had to be plated came to $125,000)



$50,000 saved on cabinet covers

Back covers for television sets cost 88 cents each when they were made from prepunched metal. The same parts, stamped from stock sheet steel, cost 44 cents. Tooling was amortized on the first 10,000 covers; Sylvania should save $50,000 on an additional 100,000 parts

COST CRISIS . . . How to Beat It

Sheet steel replaces tailored stock and terne wipes out plating costs to cut purchasing prices at Sylvania. This is an entry in the Cost Crisis Awards Competition

FABRICATORS often have a choice of several materials when they're turning sheet metal into finished goods. Their decisions have a strong influence on manufacturing costs because they determine what operations will be required and the sequence in which they'll be done.

Material switches brought substantial savings in the manufacture of television chassis and cabinet parts at Sylvania Electric Products Inc., a subsidiary of General Telephone & Electronics Corp., Batavia, N. Y.

• **In one case, the company found sheet metal less expensive to process than prepunched stock.**

Originally, the metal back cover on a 17 in. portable television set was made by a vender who bought punched material, then lithographed and embossed it.

Purchasing costs were high, and uncertain deliveries of material often caused part shortages. The company's purchasing department reviewed the part and the way it was made to see how costs could be scaled down.

The solution: A stamping supplier was asked to tool up and make the part from stock sheet metal. A perforating die, a combination notching die, and an embossing and form die were required.

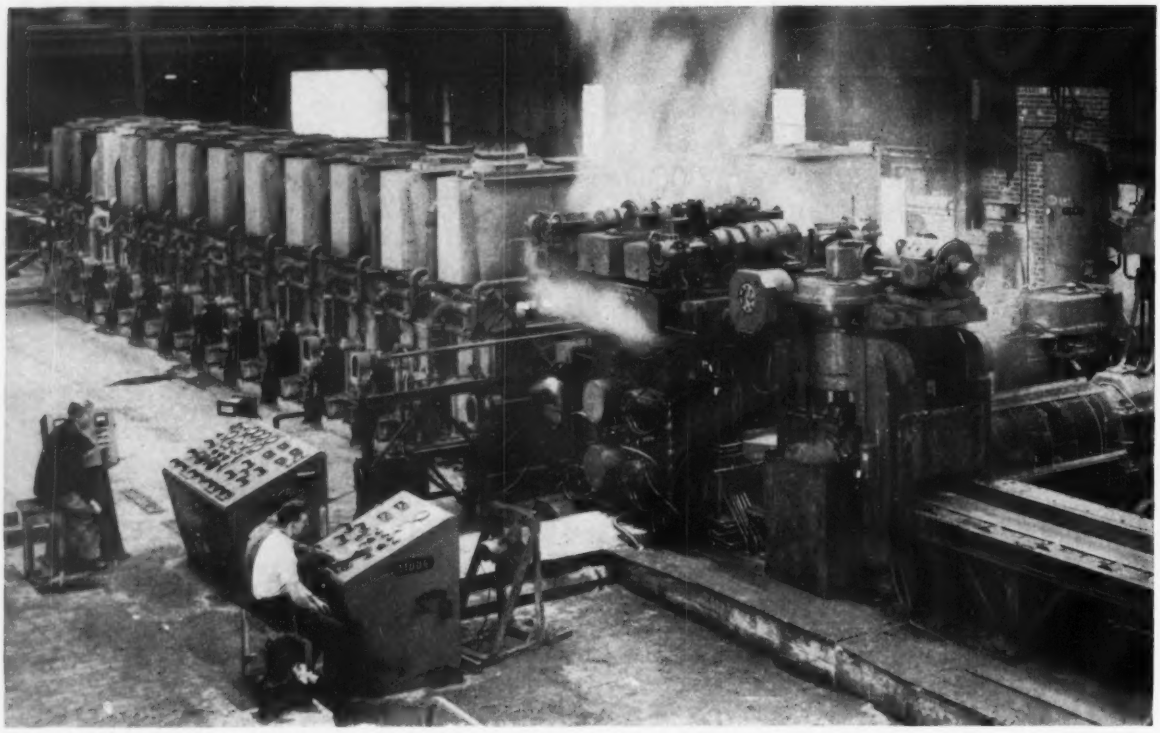
The new practice cut the purchase price of the cover 50 per cent, and it made for faster delivery. Transportation and expediting costs were also saved by getting the parts from a local supplier.

• **Purchase of precoated material brought savings in the manufacture of chassis pans and smaller stampings.**

Plating costs on chassis pans and smaller sheet metal parts often equaled or exceeded the cost of the stampings. Again, purchasing looked for a less expensive way to make the components.

With approval from engineering personnel, the purchasing department specified terne plate, instead of sheet steel, for the stampings. Costs were reduced immediately, says John A. Moskal, buyer.

Terne plate costs more per pound than plain, cold rolled steel, but it eliminated plating charges. Example of savings: One stamping costs about two-thirds what it did formerly.



Steel from heating furnaces passes through planetary mill at an English plant. The mill, now on two shifts, may soon go to three

Planetary Hot Strip Mills Set Pace in Productivity

Sendzimir mill reduces carbon or stainless steel slabs to strip in one pass. High output of units now rolling may speed acceptance by companies with limited capital, or larger firms for filling small or specialty orders

THE STEELMAKER who is considering a planetary hot strip mill can get some ideas on how well it will perform by studying four production units that have been in use three to seven years. They were designed by T. Sendzimir Inc., Waterbury, Conn.

Builders licensed by Sendzimir produced the machinery.

• Planetary mills are radically different from conventional rolling mill machinery. Slabs are reduced to strip in one pass.

Feed rolls force heated slabs into the planetary roll assembly, at the same time making a slight reduction in slab thickness.

In the planetary stand, two large backup rolls rotate in the direction of slab travel. Backup rolls are surrounded by several smaller diameter work rolls, supported by cages on the backup roll spindles and rotating in the opposite direction.

The rolling process is cyclic; rolls make contact with the unworked portion of the slab, then work downward gradually, making a rolling pass in the deformation zone and finally breaking contact with the material where it has reached final thickness.

Strip then passes through a planishing mill and into conventional coiling equipment.

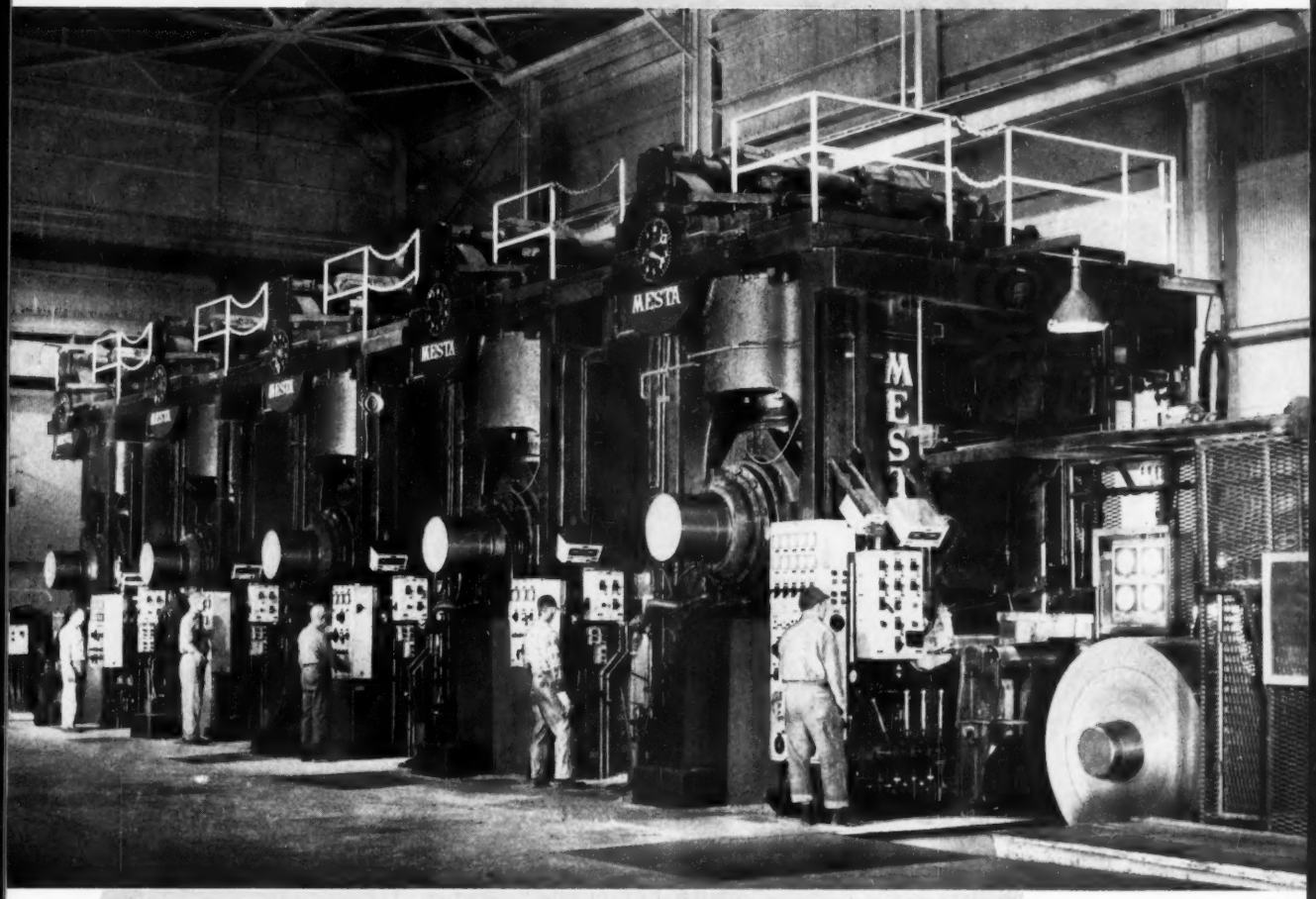
• Several steelmen say the mill is best suited for small specialty plants. But it may be used in larger operations.

The planetary mill is said to be capable of rolling any material. One mill, in Canada, rolls only stainless steel; others, in England and Italy, are used almost exclusively for carbon steel.

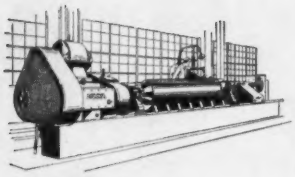
Initial cost and space requirements are modest. A planetary mill, installed at a cost of $3 million to $4 million, can turn out 75 tons of strip an hour. That makes the mill attractive to small companies, or to steelmakers in small countries,

(*Please turn to Page* 108)

MESTA Cold Mills



MESTA 48" Four-High, Five-Stand Tandem Cold Mill
Rolling Strip Steel for Tin Plate in Coils



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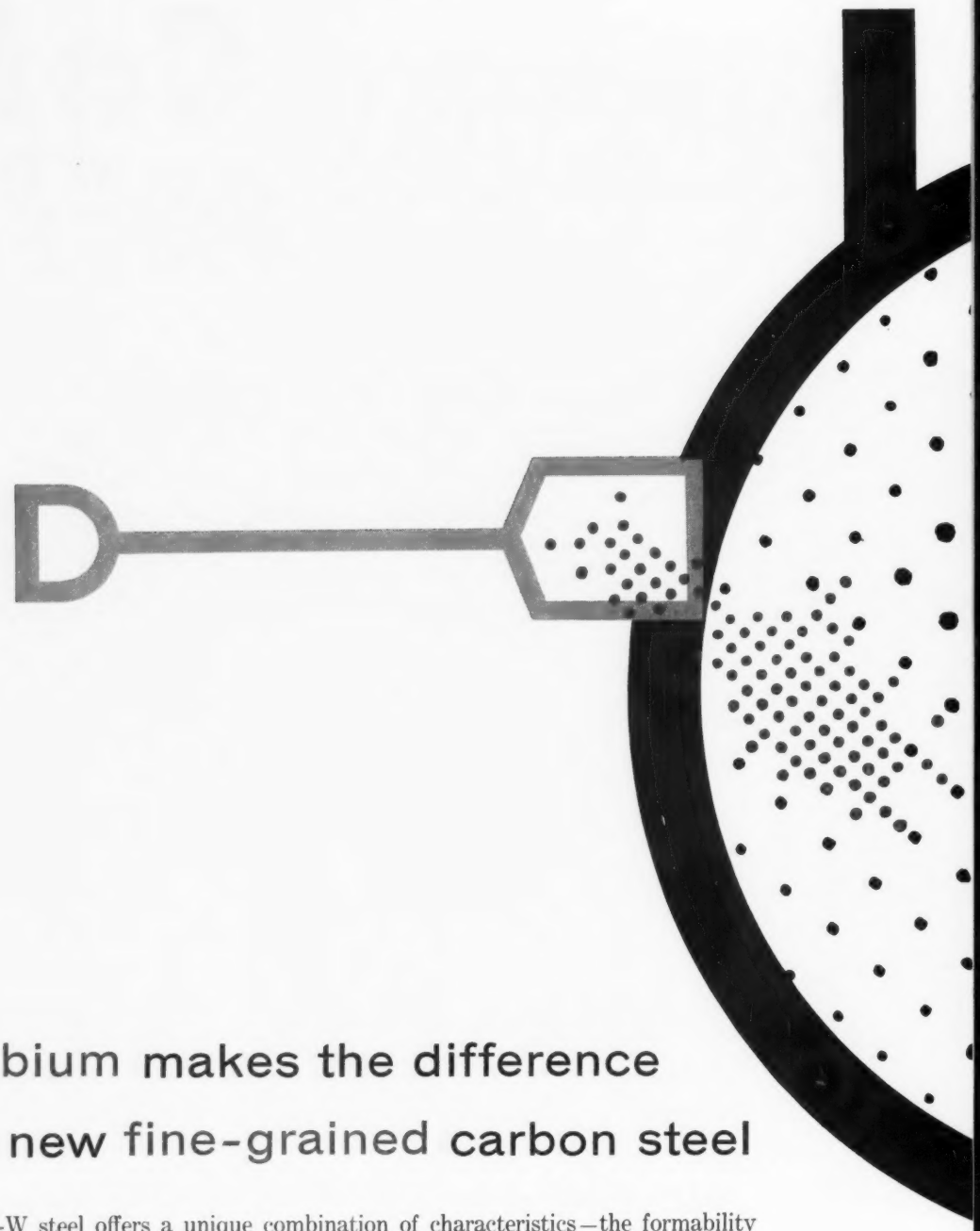

Columbium makes the difference in this new fine-grained carbon steel

The new GLX-W steel offers a unique combination of characteristics—the formability and weldability of mild carbon steel *plus* greater tensile strength and notch toughness.

The addition of small amounts of columbium gives GLX-W the finer grain structure that makes this possible.

Where design permits, the use of GLX-W can result in weight savings up to 35%, compared with mild carbon steel. With yield strengths ranging from 45,000 to 60,000 psi, GLX-W steels are recommended for a broad range of applications. For technical information, write to our Product Development Division, Department B.

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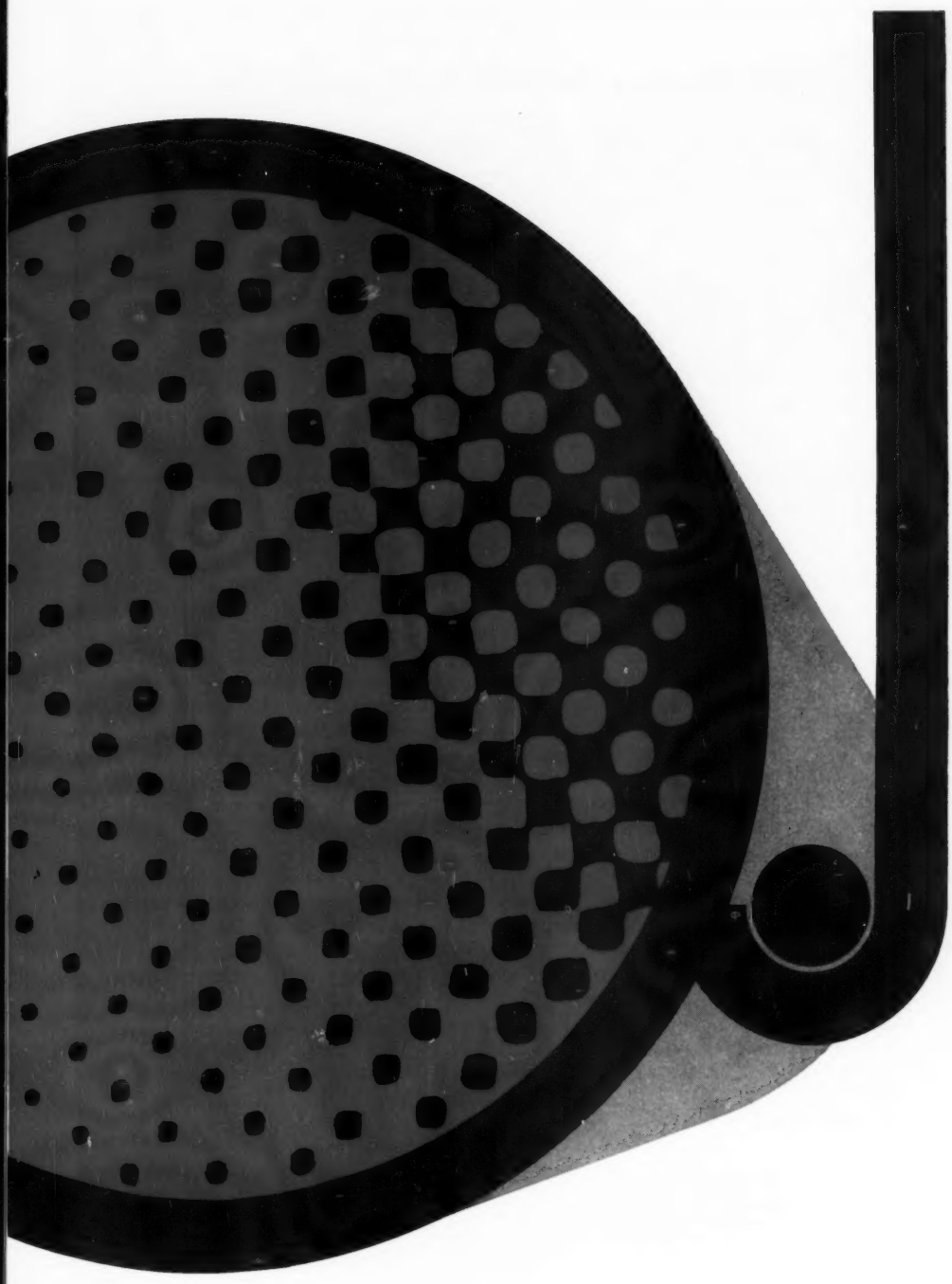


GLX-W

These Planetary Hot Mills Are Producing Steel Strip:

LOCATION	ROLL FACE (Inches)	SLAB WIDTH (Inches)	REDUCTION From	REDUCTION To	CAPACITY (Tons per hour)
Atlas Steels Ltd. Welland, Ont.	24	20	2.25 in.	0.100 in.	35
Ductile Steels Ltd. Willenhall, England	18	15	1.5 in.	0.048 in.	15
J. J. Habershon & Sons Ltd. Rotherham, England	18	15	1.75 in.	0.048 in.	15
Safim Milan, Italy	44	40	3.25 in.	0.080 in.	70

(*Continued from Page* 104)

where high volume strip output isn't essential, or capital is limited.

Larger steel producers may find the mill a worthwhile complement to conventional equipment. It can be used to roll specialty products, or small orders that cannot be produced economically on a conventional mill.

• The mill allows flexibility in rolling schedules and precise control of rolling temperatures.

In most cases, conventional rolling schedules should be adopted (strip widths should be progressively narrower as rolling proceeds). But one of the planetary mills often rolls narrow then wide strip, without requiring rolls to be reground.

Reason: Small work rolls are in contact with material being rolled only a short time. They're cooled by a spray of high pressure water, so the roll face isn't damaged.

Work rolls are usually made of hard, alloy steel. They wear slowly and don't have to be reground often. Strip rolled on the planetary mill is virtually without crown, except for camber already in the heated slab.

Temperature of metal in the deformation zone can be accurately controlled by regulating relative roll and feed speeds. The temperature between the entry and exit ends of the zone can be held constant. It can even be increased by holding roll speed constant and increasing the feed speed.

Planetary "one pass" reduction also offers benefits in rolling special metals. Some metals, like titanium, can't be heated for long periods without absorbing gases. In such cases, the metal can be heated in a vacuum, rolled in one pass with a planetary mill, then cooled quickly with high pressure water. Little gas is absorbed because the heated metal is exposed to atmosphere for only a fraction of a second.

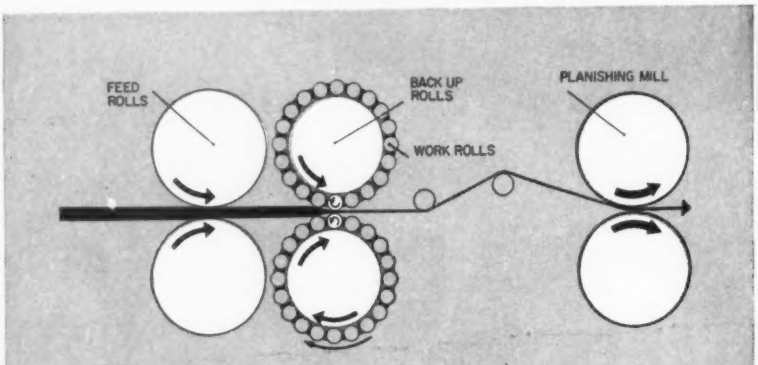
• Laboratory size planetary hot mills went into operation in the early fifties.

The first mill was built and operated by the inventor, T. Sendzimir (now president of T. Sendzimir Inc.). It produced strip 5 in. wide. Vieille Montagne, Angleur, Belgium, is now operating it as a laboratory mill. It'll probably be loaned to other interested steelmakers for demonstration and laboratory use.

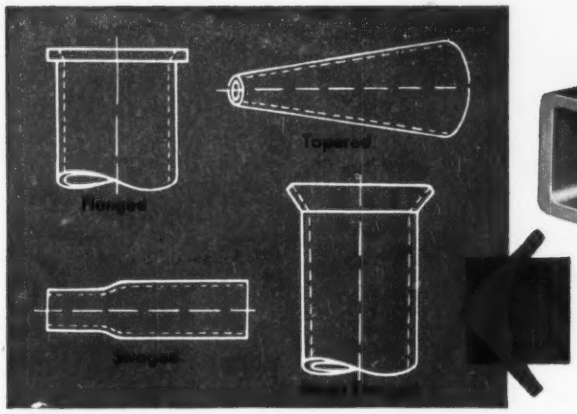
Another laboratory mill (at the Naval Ordnance Laboratory, Washington) produces 8½ in. strip. Two 11 in. test units are in use; one is at Magnetics Inc., Butler, Pa.; the other is at General Electric Co., Schenectady, N. Y.

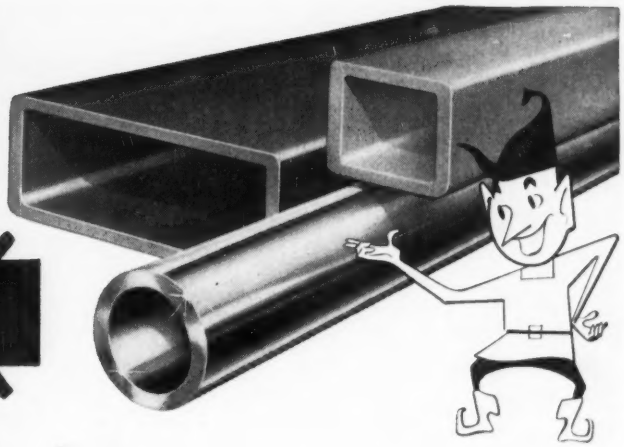
• Full size mills, in operation several years, have won the confidence of several steelmakers.

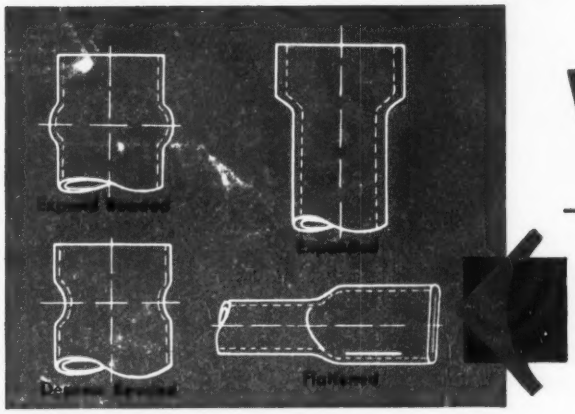
The first full size planetary hot mill was built by John Bertram & Sons Co. Ltd., Dundas, Ont., and installed at Atlas Steels Ltd., Welland, Ont. It rolls 20 in. wide stainless steel slabs, produced by



Slab is reduced to steel strip in one pass through feed rolls, planetary stand, and planishing mill. It's coiled on conventional equipment







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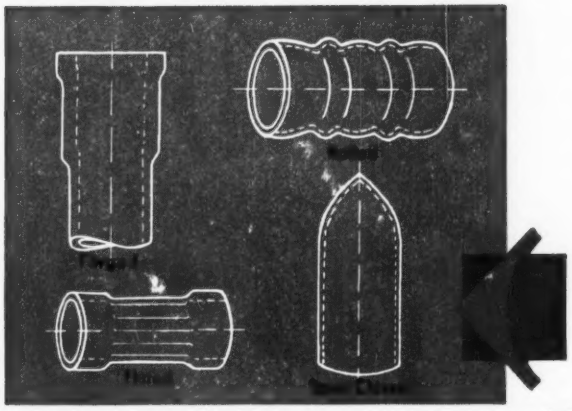

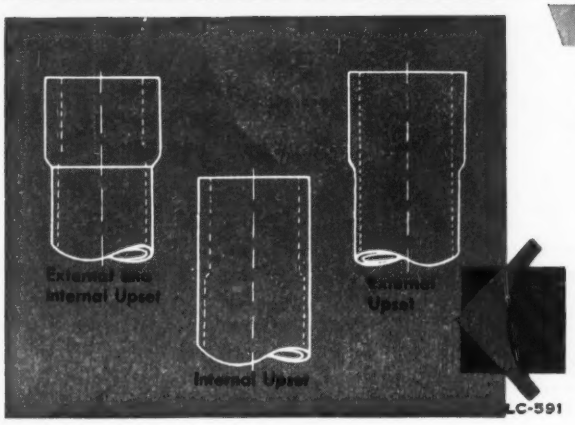

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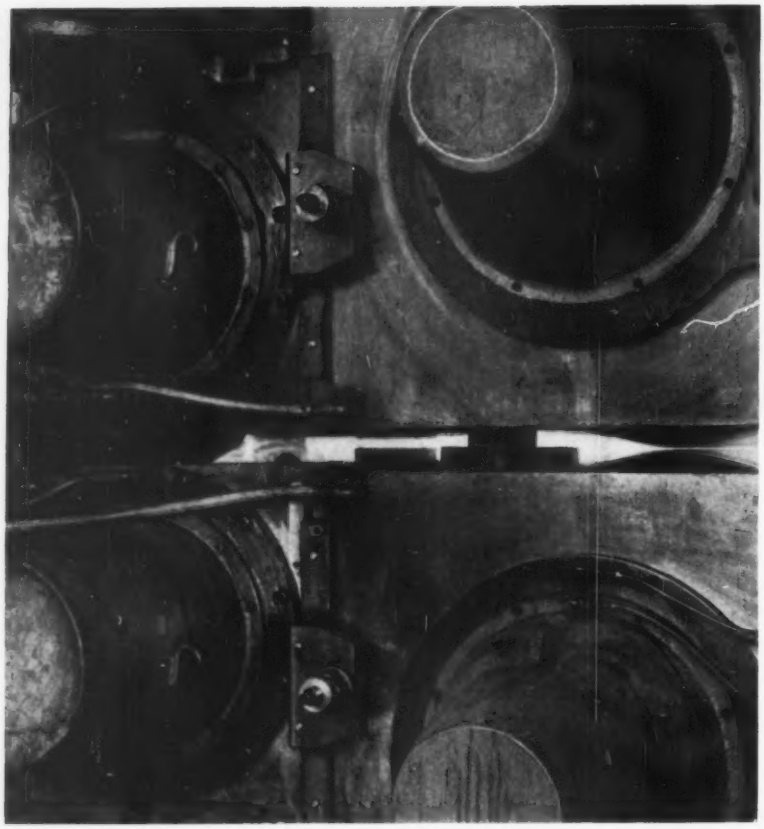


Heated slab is pushed into the planetary stand by the feed rolls. Mill operator has a clear view of the steel as it passes through the roll bite

a continuous casting machine and rolled in a blooming mill. It's operating only five days a month, but it keeps the company's cold rolling facilities busy.

Two planetary hot strip mills are in operation in England. Built by W. H. A. Robertson & Co. Ltd., Bedford, they roll 15 in. wide carbon steel slabs. One of the mills is at Ductile Steels Ltd., Willenhall. The other, at J. J. Habershon & Sons Ltd., Rotherham, began two shift operation recently. It may be put on three shifts.

A fourth mill, built by Societa Innocenti, Milan, Italy, is in operation at Safim, a steel company in Milan. The mill rolls stainless or carbon steel slabs up to 40 in. wide.

• Sendzimir expects to get orders for several mills next year.

One mill, under construction at an integrated steel plant in northern Sweden, is slated to start production in 1961. It has a roll face of 44 in. and will accept slabs up to 4½ in. thick and 40 in. wide. It will turn out steel strip and plates at a rate of 70 tons per hour in gages as light as 0.063 in. The mill is expected to be used on several grades of steel.

• Planetaries may eventually be combined with continuous casting setups in integrated mills.

A planetary mill that could take slabs directly from the continuous casting machine would eliminate the need for slabbing or blooming mill. That is almost a reality at Atlas Steels.

Atlas has continuous casting facilities that produce slabs for its hot strip mill, but the slabs are reduced in a blooming mill, cooled, and reheated before they are rolled in the planetary.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Honeycomb Vacuum Brazed

Equipment for vacuum brazing of stainless steel honeycomb structures on a production scale has been ordered from F. J. Stokes Corp., Philadelphia, by Grumman Aircraft Engineering Corp., Bethpage, N. Y.

The equipment, capable of brazing panels with areas of more than 50 sq ft, will be used at Grumman to fabricate structures for the Eagle, an air-to-air missile under development by the U. S. Navy's Bureau of Aeronautics. Grumman has a subcontract from Bendix Aviation Corp.'s Systems Div., Ann Arbor, Mich., for the missile airframe, propulsion system, and ground handling equipment.

The process doesn't require expensive welded envelopes around the work. It permits rapid loading and unloading of the panels in process. The high vacuum atmosphere prevents oxygen from contaminating the core and skin of the honeycomb and eliminates the cost of inert gases. High vacuum and high temperatures also tend to remove residual surface contaminants.

Continuous Casting Gains

Continuous slabs up to 36 in. wide have been cast in Zurich, Switzerland, by Concast Co. Ltd. The company is building wide slab casting machines for Yawata Iron & Steel Co. Ltd., Tokyo, and for Ste. des Fonderies de Pont-a-Mousson (France). The new machines will produce slabs 4 to 8 in. thick, up to 50 in. wide.

Concast has also built two, horizontal, continuous steel casting machines, which have worked well in tests. A third horizontal machine will go into operation soon in Europe. The horizontal method has already been applied commercially in making nonferrous billets.

Carbide Nozzles Hold Up

Hard carbide spray nozzles (Kennametal K-6) have exceeded 13,000 hours in service. The job: Applying sealing material on metal can lids. The previously used material lasted 540 hours.

The carbide nozzles (made by Kennametal Inc., Latrobe, Pa.) permitted a pressure increase from 55 to 100 psi that boosted quality and cut rejects.

Surplus Machines Trigger Builder's Ire

Government's method of marketing its extra machine tools has been an issue since mid-forties. No one has found a way to keep companies from getting hurt

THE GOVERNMENT has become the largest seller of machine tools in the country, alleges E. C. Bullard, chairman, Bullard Co., Bridgeport, Conn. He feels the rate at which surplus government machines are coming on the market is putting a crimp in the machine tool industry's attempt to recover from the slump.

"Last year, about 30,000 metal cutting machines were shipped by our industry to all customers," continues Mr. Bullard. "In the same period, it is estimated that the government sold some 12,000 to 15,000 units, or about a third of all units sold."

• **Example** — Mr. Bullard reports that a few weeks ago the government sold eight Bullard vertical turret lathes which had been used by the Curtiss-Wright Corp. facility at South Bend, Ind.

The machines sold for $143,000 to "good Bullard customers." They cost $422,334 new, or about $689,454 today.

• **Wrong Ones Sold**—Mr. Bullard feels that one of the major problems with the practice is that many machines disposed of are in better shape than some government machines still running. For example, the eight machines probably should never have been put on the market. Reason: Another government facility, not too far from South Bend, is using older, spiral drive VTLs.

In this case, the government could have gained, but it lost.

• **More to Come**—Mr. Bullard is less concerned about that incident than he is about future surplus sales.

"We have reason to believe that a large number of Bullard war-produced VTLs will come on the market in the near future—enough to account for our estimated peacetime production for the next 15 years."

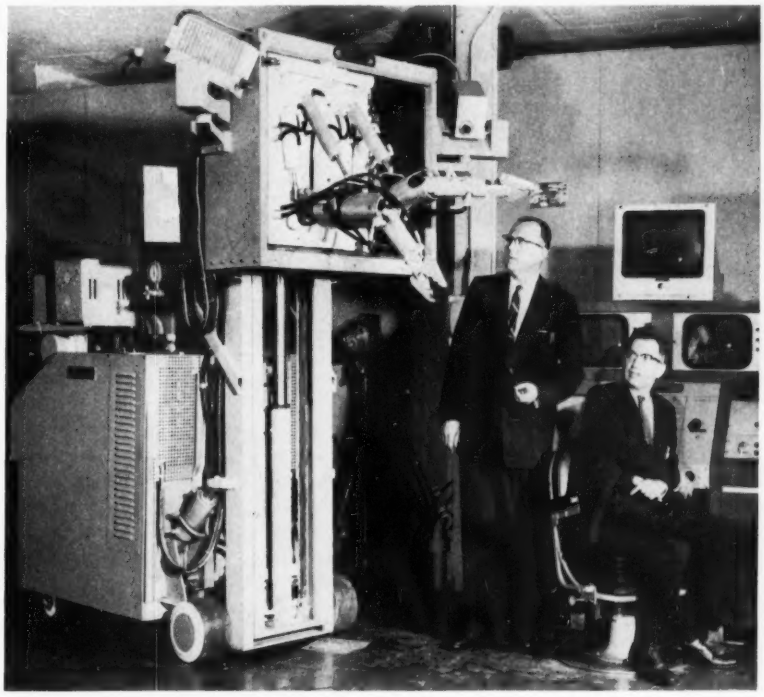
• **Solutions**—Obsolete, or useless, machines in the government inventory represent a substantial taxpayer investment, and a return on the investment is a must.

But there is, and will continue to be, a dispute over the way the disposal is accomplished. Three suggested practices might help:

1. Get rid of oldest, most obsolete equipment first. Make good, but idle, equipment available to other government facilities so a swap could improve utilization of machines on the government payroll. Such is the intent of present government policies, but they break down in practice.

2. Release machines to the market through established channels, the dealers of used machines, who sometimes find government competition tougher to fight than the builders do.

3. Release them at a price that will result in an advantage for the buyer and provide a reasonable return for tax-supported government coffers.



REMOTE CONTROL HANDLING DEVICE finds, lifts, places, and inverts radioactive objects in the Albuquerque, N. Mex., plant of Sandia Corp., Atomic Energy Commission contractor. Called the Mobot, it is operated from the console at the right. The TV screen at the top monitors a fixed camera covering the entire working area while lower screens show closeups of the Mobot's hands. Mobot's creator, Dr. John W. Clark, Hughes Aircraft Co., Culver City, Calif., is seated at the console. The other man is Robert W. Henderson, vice president of Sandia

integrated CRUCIBLE steel service

Orders for specialty steels go out fast — usually overnight or even earlier — from *local* Crucible warehouses. That's because each warehouse has a wide variety of grades and sizes on hand, *at all times.*

gives you local stocks of 16,000 specialty steel items for immediate delivery

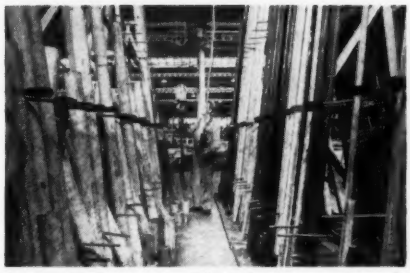
Within minutes, the Crucible inside account salesman can tell you if the grades, sizes and quantities you need are available. He'll check his customer's master file for your delivery requirements, billing details, etc. And then he'll quickly arrange for cutting to meet customer's requirements. So deliveries are swift and sure.

This combination of large local stocks and warehouse efficiency means you can fill even the most varied or unusual requisitions for specialty steels with a single phone call.

It's a basic reason why purchasing agents who *depend* on local sources call Crucible *first* – like this one:

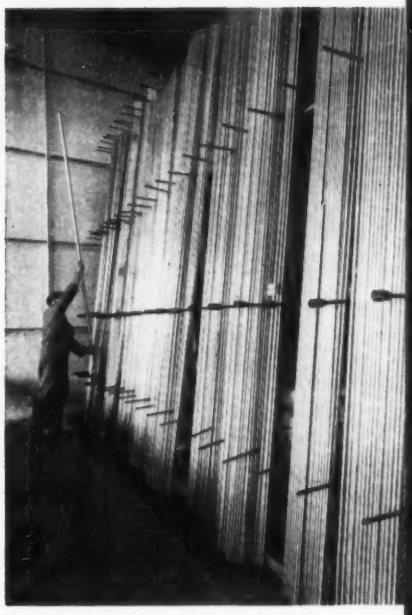
"We're basically a tool and die 'job' shop. We never know what steel we'll be using from one day to the next. So whatever we need, we need fast. It has been our experience that it saves time to call the Crucible warehouse first."

Why not simplify and speed up your specialty steel purchases by relying on your local Crucible warehouse? The advantages of Crucible's entire integrated operation, from mining the ore to steelmaking and warehouse delivery, are all available through the nearby source. *Crucible Steel Company of America, Dept. PK15, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*



Local warehouse can fill both large and small orders from stocks like these of hollow tool steel sections and solid rounds.

Die casting die steels and plastic mold steels stand ready for cutting to order and immediate delivery.



Most Crucible warehouses stock stainless bars — stack them upright in "A" racks to protect the surfaces.

TOOL STEELS—Water, oil, air hardening, shock resisting, hot work, plastic and die casting steels in all forms, including bars, sheets, plates, drill rod, hollow bars, forgings and flat ground stocks

HIGH SPEED STEELS—Crucible's famous "Rex"® steels: Rex Thrift Finish rounds, hot rolled and cold drawn flats and squares, drill rod, forgings, sheets, plates, and tool bits

STAINLESS STEELS — Bars, sheet, strip, wire, cold heading wire, metalizing wire, plates, angles

FREE MACHINING STEELS — Crucible Max-el® rounds, hexagons, plates and brake die steel

ALLOY STEELS — Bars, billets, strip and sheet

COLD ROLLED CARBON SPRING STEELS

DRILL STEELS — Hollow and solid drill steels

ALUMINUM EXTRUSION DIE STEELS

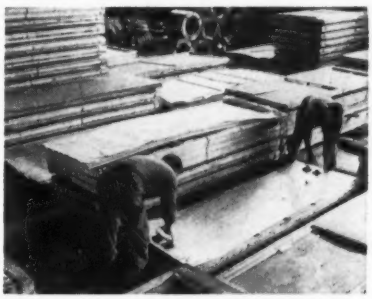
HOLLOW TOOL STEEL

HARD FACING ROD

PLASTIC MOLD STEELS

PERMANENT MAGNETS

— and many others



Need stainless sheet? The local warehouse stocks most types, finishes and sizes for prompt delivery to you.

STOCK LIST

Keeps you up-to-date on local stocks of specialty steels. Just ask the Crucible salesman to place your name on the regular mailing list.

One Source For All These Steels

CRUCIBLE STEEL COMPANY OF AMERICA

Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Columbus • Dallas • Dayton Denver • Detroit • Erie, Pa. • Grand Rapids • Harrison • Houston • Indianapolis • Kansas City • Los Angeles • Milwaukee • New Haven New York • Philadelphia • Pittsburgh • Portland, Ore. • Providence • Rockford • Salt Lake City • San Francisco • Seattle • Springfield, Mass. St. Louis • St. Paul • Syracuse • Tampa • Toledo • Tulsa • Toronto, Ont.

Interstate Gets a Higher Quality Finish and Paint Mileage is More Than Doubled with

RANSBURG

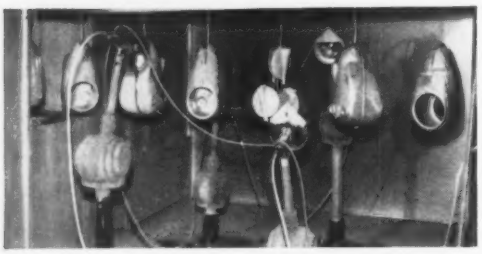
NO. 2 PROCESS ELECTROSTATIC SPRAY PAINTING

in finishing

COMPACT
VACUUM CLEANERS

Interstate Engineering Corporation in Anaheim, Calif. switched from hand spray to Ransburg automatic Electro-Spray in the painting of their quality line of home renovating products: The COMPACT vacuum cleaner . . . the POLISH-AIRE floor polisher . . . and MAGIC DISC carpet and rug sweeper.

RESULTS? Quality of the painting improved, for with former hand spray, rejects used to run as high as 10%. That's because of Interstate's high quality standards. NOW, with Electro-Spray, rejects are cut to less than 2%! This alone would have justified the change, but Ransburg Electro-Spray also provides substantial labor and material savings. One operator now does the work of two. And, with the former method, Interstate was painting only 28 sets of parts per gallon of paint. NOW, they get 57 sets of parts per gallon. Think of what 50% savings would mean in YOUR finishing department.



Vacuum cleaner parts are painted with wrinkle enamel as they pass through the electrostatic spray painting area in the finishing department at Interstate Engineering Corp. Unpainted parts, entering from the right, are coated uniformly by the two Ransburg atomizing bells on either side of the line.

NO REASON WHY YOU CAN'T DO IT, TOO!

Let us show YOU and test-prove the advantages of automatic electrostatic spray painting on YOUR products in our complete laboratories. Call or write for our No. 2 Process brochure which shows a variety of automatic painting installations on a wide variety of products in both large and small plants. Or, if your production doesn't justify automatic painting, let us tell you about the new No. 2 Process Electrostatic Hand Gun which can be used in either conveyorized, or non-conveyorized painting.

RANSBURG

RANSBURG
Electro-Coating Corp.
Box-23122, Indianapolis 23, Indiana

Heat of Missile Re-entry Simulated by Jet Burner

A means of testing the resistance of missile materials to the heat of aerodynamic friction has been developed by Selas Corp. of America, Dresher, Pa.

Selas engineers designed a gas-air burner that produces 6 million Btu per hour at 3000° F, with a flame velocity of 2000 ft per second. Energy is released at a rate exceeding 2000 hp.

In the laboratory, a heat flux curve was simulated by moving a target toward the burner blast on a programed time schedule. Previously, re-entry conditions were simulated by placing missile components near the tail pipes of rocket or jet engines. That method proved inconvenient and expensive for some tests.

Cement Trims Repair Costs On Pittsburgh Steel Stack

Iron cement saved time and the cost of repair parts when a blast furnace was relined at the Monessen (Pa.) Works of Pittsburgh Steel Co. Cement was supplied by Smooth-On Mfg. Co., Jersey City, N. J.

Bracket castings supporting the distributor ring were warped, preventing a new distributor from seating properly. Iron cement made a gastight fill, saved the cost of new castings (about $25,000), and helped the company avoid a two week shutdown.

The cement was also used to fill voids caused by warped support columns, base plates, and top plates.

Clip Holds Patching Brick

A new patching brick for basic furnace roofs has been patented by Lincoln A. McGill and Richard S. Moore, of Harbison-Walker Refractories Co., Pittsburgh.

A slot in the brick case and a recess in the brick permit a support clip to be inserted. Patch bricks are supported by adjacent bricks, rather than tierods. Clips are available in several shapes; special shapes can be provided.

The practice is to secure the patch brick to tierods or other supports in the roof structure.

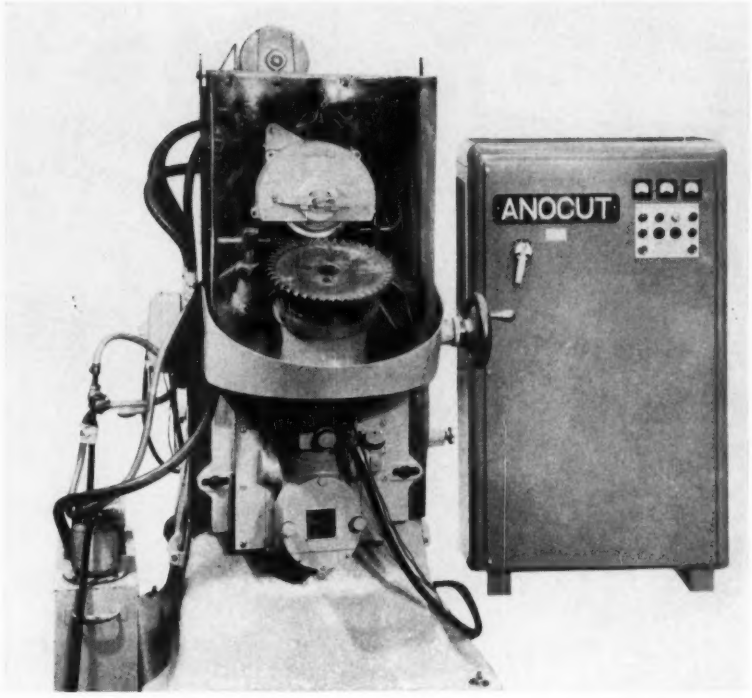
Face Mill Grinder Uses Electrolytic Stock Removal

ELECTROLYTIC stock removal on this automatic face mill grinder reduces diamond wheel costs, increases cutter life, improves finish, and cuts grinding runout on the face mill, says the maker. Other advantages: Carbide insert cracking and checking are eliminated.

In an automatic cycle the machine grinds the lead angle, corner radius, face radius, dish, and soft steel backing of inserted teeth. Tooth shape is controlled by a cam arrangement. Machine cycle time (on a given tooth) averages 29 seconds for an 8 microinch finish.

The four machine sizes accommodate face mills from 4 to 21 in. in diameter. The face plate holding the cutter indexes automatically and can be set for eight teeth or more. The machine uses a 300 ampere Anocut electrolytic unit (or equivalent).

For further information, *write* Oliver Instrument Co., 1416 E. Maumee St., Adrian, Mich.

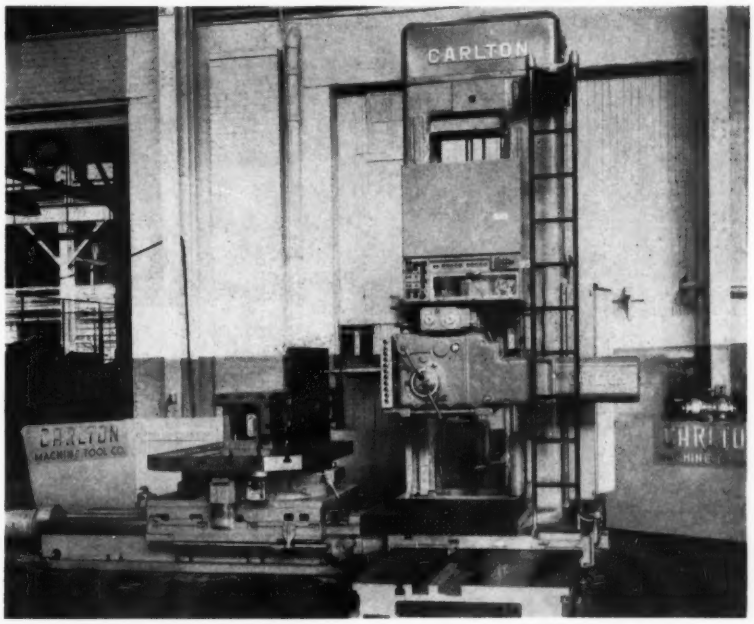


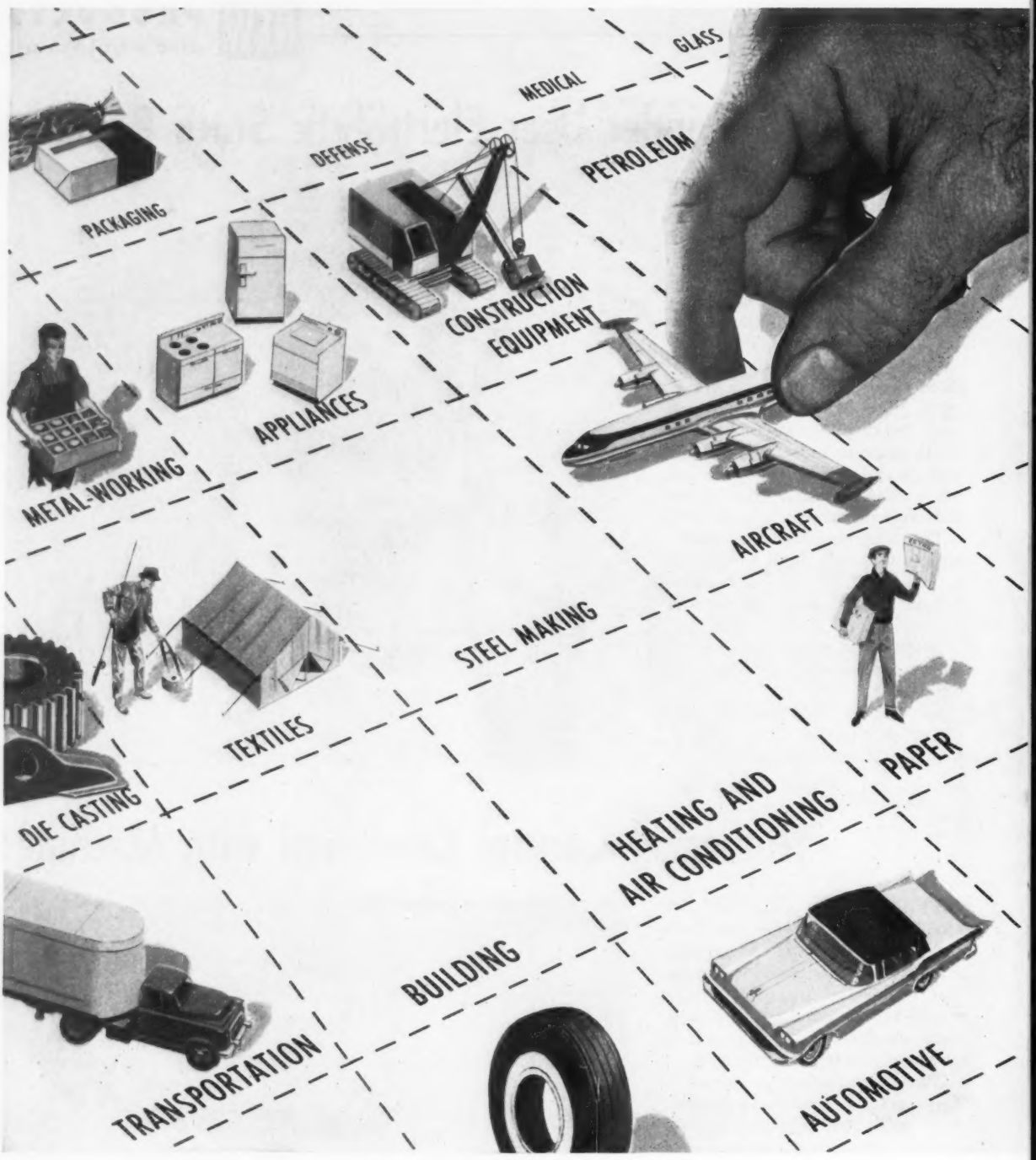
Numerical Control Combined with Machines

A NUMERICAL CONTROL is combined with the Carlton horizontal and planer type boring and drilling machines. The combination is designed to speed drilling operations, improve work quality, eliminate elaborate tooling, and to up use of drilling machine tools.

Three programing methods: 1. Tape control is used for automatic, three axis, tool positioning and automatic speed-feed changes. Tape is 1 in. wide (8 channel). Zero offset establishes a new starting point from the workpiece regardless of location. 2. A keyboard for separate, nontaped operations provides manual input of 5 or 6 digit numerical data for each axis. Numerical values (actuated by keyboard or tape) are shown by indicator lights. 3. Pushbuttons control rapid and slow traverse power driven units

(*Please turn to Page* 118)



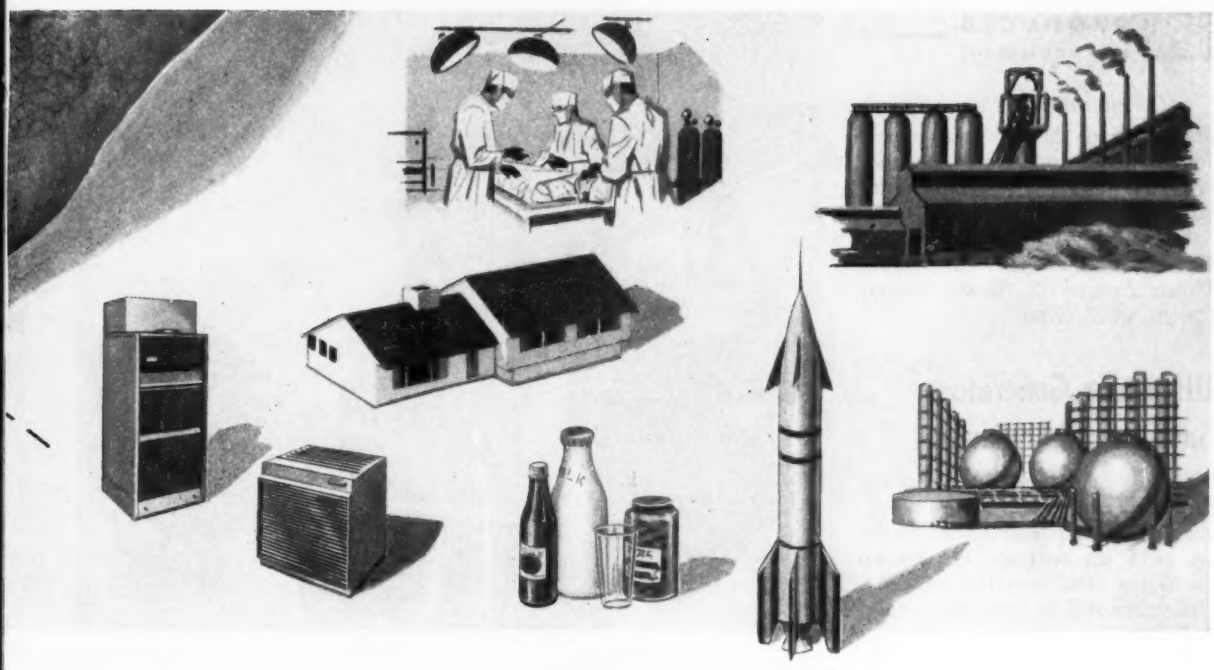


M-R MIDLAND-ROSS CORP.

MIDLAND—

Executive Offices: 55 Public Square • Cleveland 1, Ohio

DIVERSIFIED TO SERVE NEARLY ALL INDUSTRIES . .



To serve even more industries even better...

MIDLAND-ROSS ADDS SURFACE COMBUSTION and JANITROL

On November 9, Midland-Ross Corporation acquired for cash the Surface Combustion Corporation, its Janitrol Divisions, and subsidiaries.

Midland-Ross's purchase of Surface is another step in its program of planned expansion into new products, services and markets. Surface and Janitrol fit this pattern ideally. No changes in management or operations are contemplated for the new acquisitions.

Already serving scores of industries, Midland-Ross will now add many other growth industries being served by Surface and Janitrol... steel-making, metalworking, ore processing, petroleum refining, glass, medical, and marine with Surface and Kathabar equipment... residential, commercial and industrial building with nationally advertised "Janitrol" oil- and gas-fired furnaces, unit heaters, and air-conditioning equipment... aircraft and missile with Janitrol Aircraft products.

Assets of the enlarged Midland-Ross organization are now over $70,000,000. Employees now total 5,800. Fourteen plants are located in six states and Canada. Sales in 1960 are forecast at more than $120,000,000.

For a copy of "Quick Facts about Midland-Ross, Surface, and Janitrol," write to:

—ROSS CORPORATION

Automotive frames; process and production equipment for the paper, textile, rubber, plastics, and foil industries; pneumatic controls and compressors for mobile equipment; power brakes; die castings; metal-decorating, laminating and painting equipment; steel-mill equipment and heat treat furnaces; industrial ovens; humidity-control equipment; residential, commercial and industrial heating and air-conditioning equipment; aircraft, missile, and ground-support heaters, heat exchangers, and controls.

. . INTEGRATED TO SERVE THEM BETTER

(*Concluded from Page* 115)

and position the axis movements for manually operating the machine to establish different data points.

For further information, *write* Carlton Machine Tool Co., Spring Grove Avenue & Meeker Street, Cincinnati 25, Ohio.

Ultrasonic Generators Smaller, Lightweight

USE of solid state devices (triodes) in the Westinghouse line of ultrasonic generators has reduced weight up to 80 per cent and cut size up to 50 per cent, says the company. Reliability and performance are also improved.

More advantages: The more efficient equipment has reduced energy costs, lowered internal temperatures, and eliminated warmup requirements. High voltages aren't needed.

The units can energize transducers for cleaning tanks ranging from 1½ to 16 gallons.

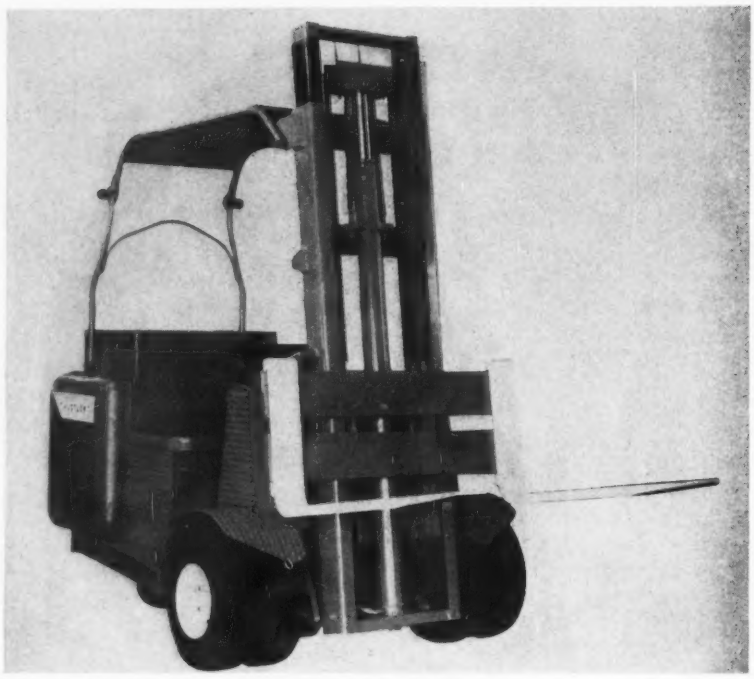
For further information, *write* Industrial Electronics Dept., Westinghouse Electric Corp., 2519 Wilkins Ave., Baltimore 3, Md.

Black Oxide Process Faster, Has Less Dragout

BLACK OXIDE processing with Activated Black Magic reduces processing time, lowers salt consumption, and lowers dragout by 25 to 30 per cent compared with conventional solutions, says the maker.

The single bath solution is free rinsing and produces a dense black, clean finish. Self-rectification is improved too. Contaminants react immediately and are forced to the top of the solution. You can skim it off the top or it can be automatically removed during the dragout and washed away in the rinse water.

For further information, *write* Mitchell-Bradford Chemical Co., Wampus Lane, Milford, Conn.



A DUAL PNEUMATIC ELECTRIC FORK LIFT TRUCK (Hustler Outdoorsman) has a battery capacity up to 720 ampere hours and can handle 2000 lb loads over an 8 hour shift on rough terrain. It has four speeds forward and reverse with nonplugging controls. For further information, **write** Heifred Corp., 37877 Elm St., Willoughby, Ohio

Phosphating Compound Is Lower Temperature Type

LOWER phosphating temperature (by as much as 75° F) is claimed for Turcoat Low Temp. The maker says that at 95° F, a paint gripping zinc phosphate coating on iron, steel, or zinc is equal to processes operated at temperatures up to 180° F.

A uniformly smooth paint bond coating of up to 200 mg per sq ft takes 2 minutes at 95° F. When used as a base for corrosion prevention, a coating up to 1100 mg per sq ft takes 10 to 15 minutes at 95° F. It can be applied by immersion or spray washer. Savings of about 75 per cent in steam, water, electricity, and downtime costs are claimed.

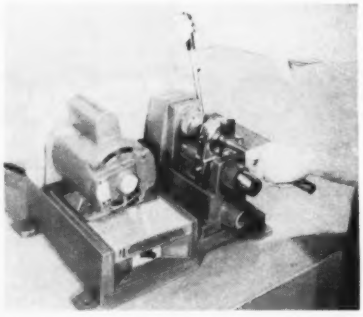
For further information, *write* Turco Products Inc., 24600 S. Main St., Wilmington, Calif.

End Finishing Machine Chamfers, Forms Faster

SIMULTANEOUS deburring, facing, and chamfering as well as drilling, reaming, or light spinning operations can be done on the Model 600 end finishing machine. Operators can accurately finish up to 800 tube and rod ends an hour.

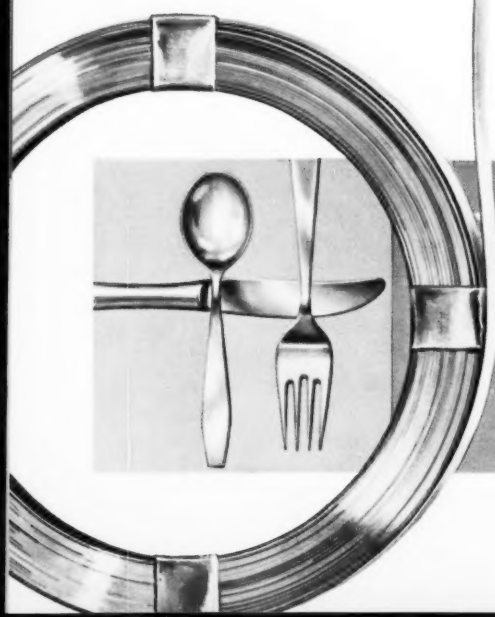
A heavy one piece head frame

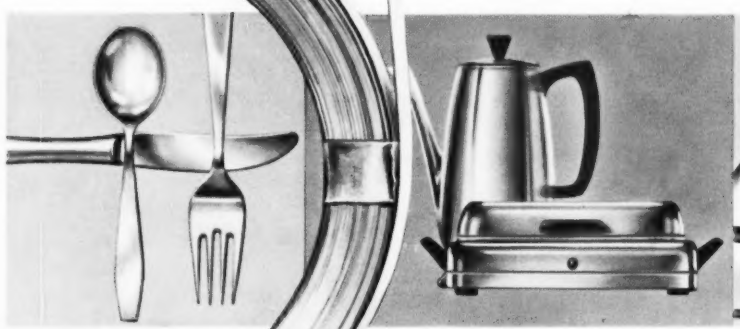
(*Please turn to Page* 123)

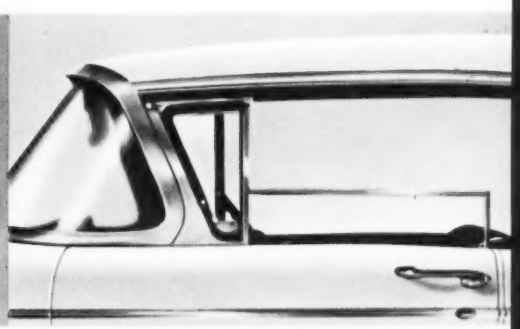


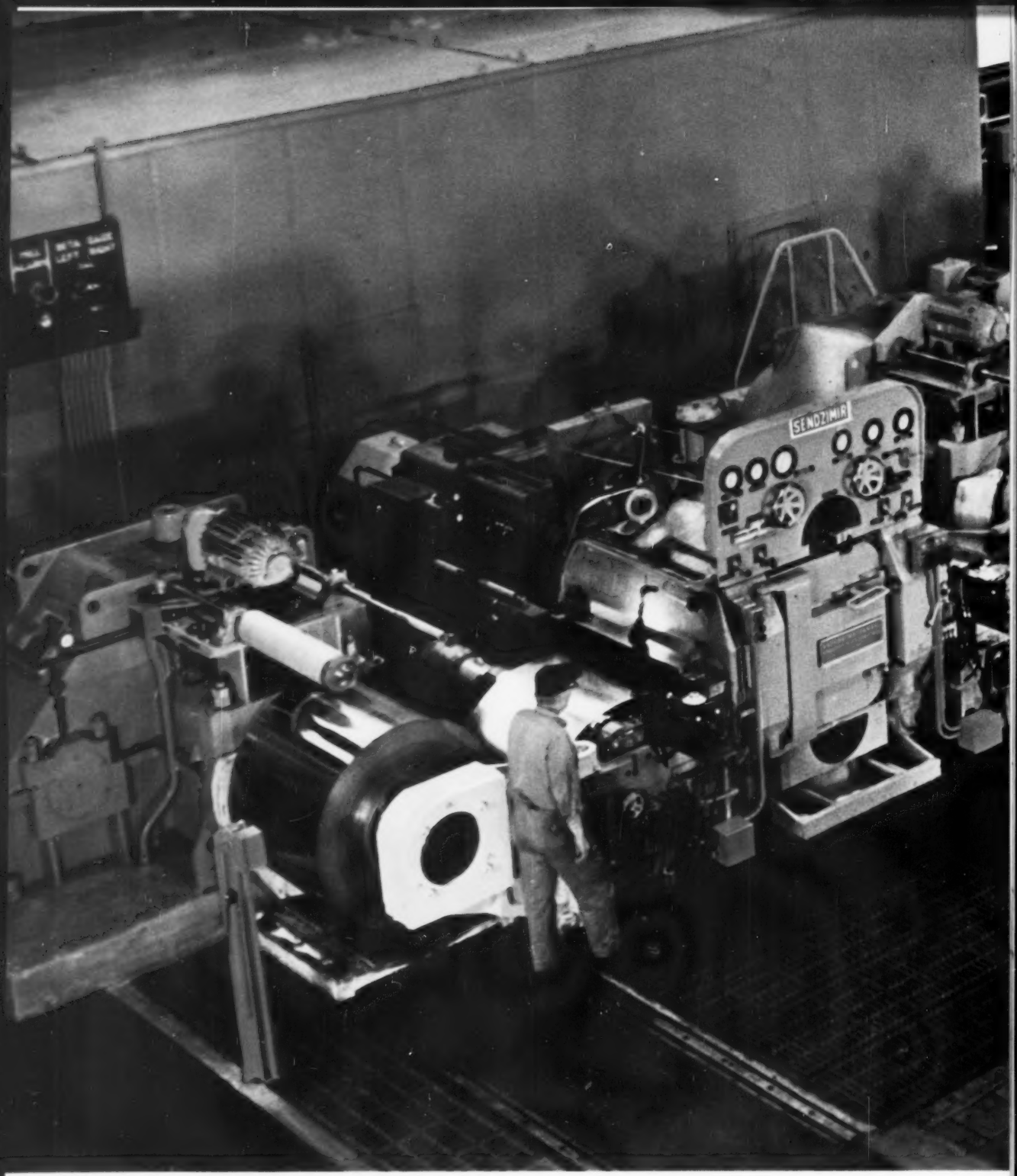
The stainless steel strip you see here is as thin as the paper in your hand

New American Steel & Wire
Sendzimir Mill rolls stainless steel strip
as thin as .005
with uniform gauge and quality
throughout entire coil



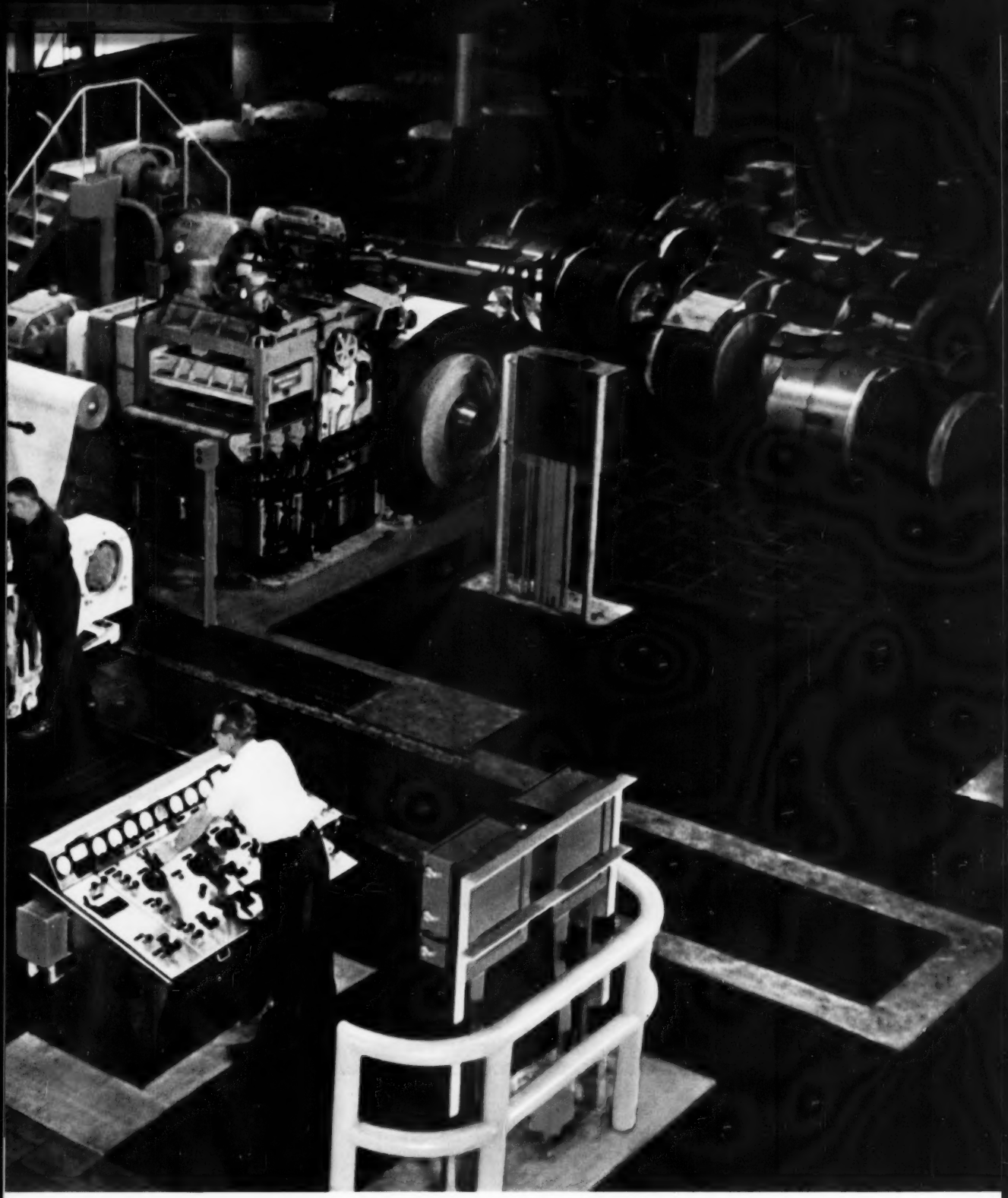






This new Sendzimir Mill . . . the first of its kind in the Cleveland area—is now in operation at American Steel & Wire's Cuyahoga Works, producing ultra-thin gauges of high luster stainless strip at very close tolerances. This 37-inch "Z" mill will accept strip 0.150 inch thick and will reduce it as thin as 0.005 inch.

The very latest non-contact precision gauges continuously measure and automatically control the thickness of the steel and assure uniformity throughout the entire coil. A radio-active source is used to emit beta rays which measure strip in the 0.005" to 0.028" range. Other beta rays, converted to gamma rays, gauge the strip thickness



above 0.028". It is the continuous operation of these controls which assures the absolute uniform thickness of the finished coil of strip.

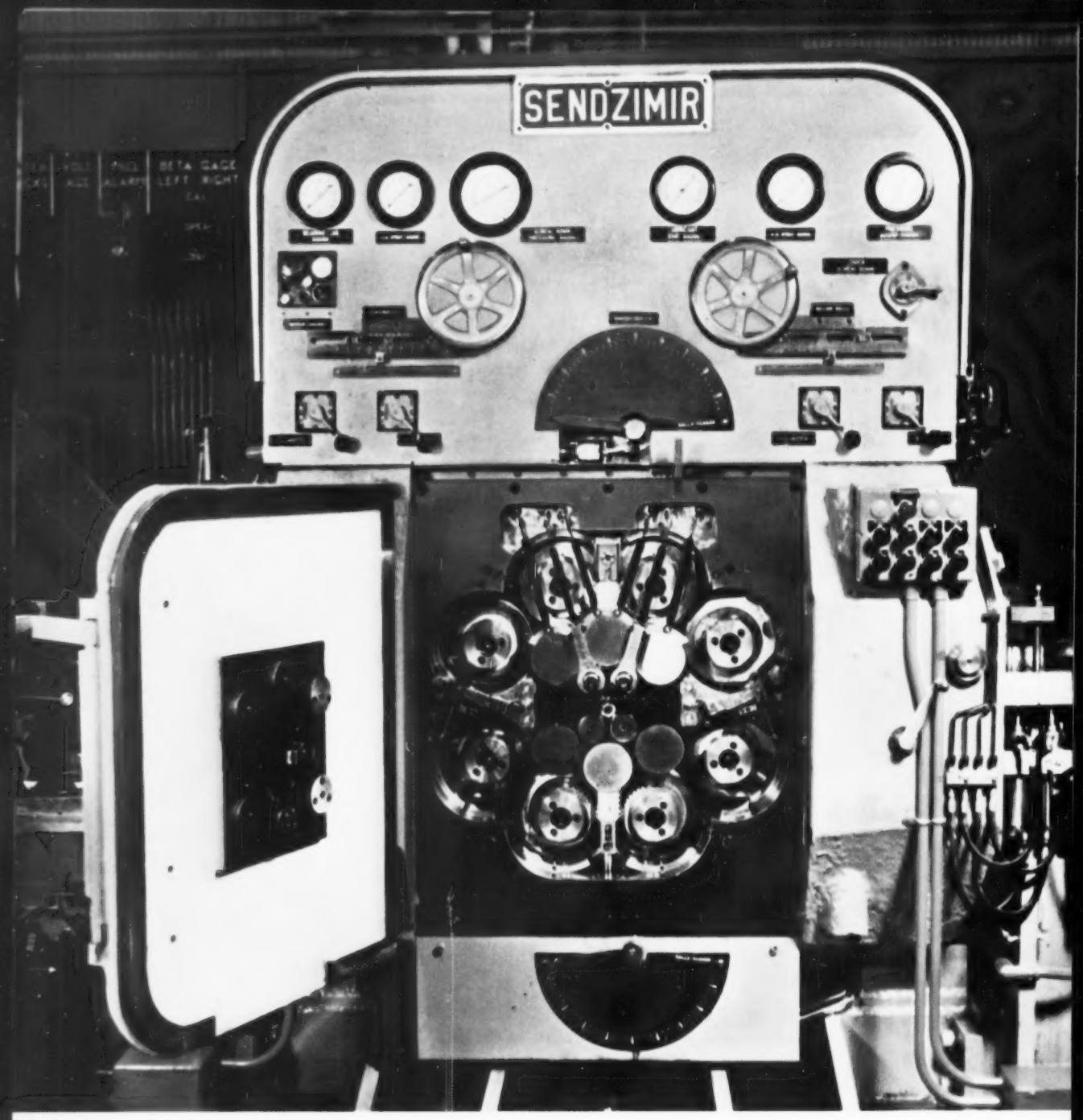
The "top drawer" treatment of stainless steel strip doesn't stop with the new "Z" mill. Improved welding, annealing and pickling lines, plus new surface conditioning units are all part of American Steel & Wire's program to produce top-quality stainless strip. Continuous paper interleaving during the entire manufacturing cycle is an added precaution to protect the finish.

USS is a registered trademark

American Steel & Wire
Division of
United States Steel

USS

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Alabama, Southern Distributors
United States Steel Export Company, Distributors Abroad



In this close-up you see the real "heart" of the Sendzimir Mill. In the center of the roll assembly are two highly polished small diameter work rolls. Five back-up rolls and 4 back-up bearing shafts supply the driving power and control the pressure for each of the work rolls. Stainless steel strip passes through this new reducing mill at the rate of 500 feet per minute.

American Steel & Wire
Division of
United States Steel

USS

(*Concluded from Page* 118)
provides integral support for spindle and chuck jaws, permitting heavier cuts and spinning of nonferrous tubes. The machine weighs 175 lb and requires a space 20 in. wide and 17 in. deep.

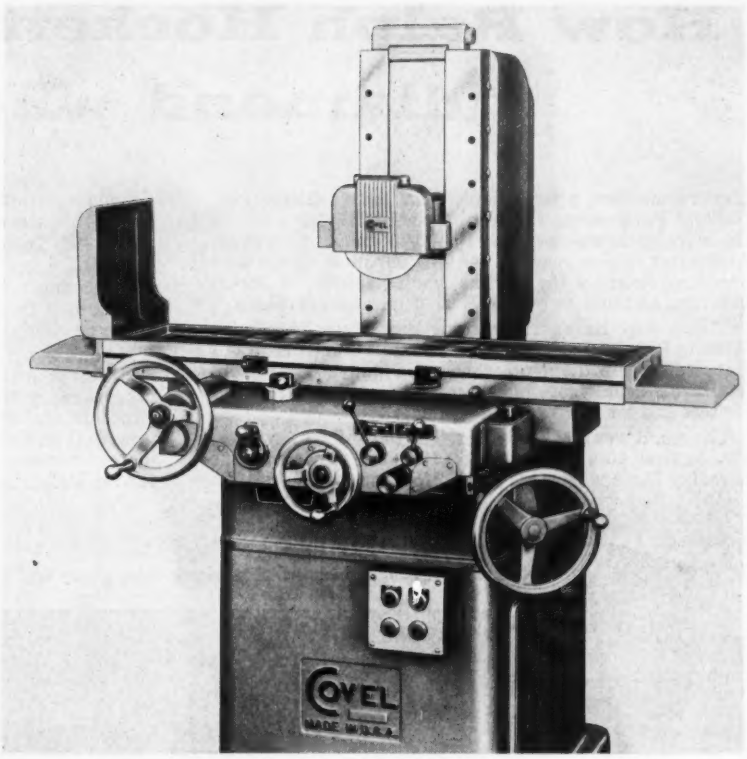
For further information, *write* Pines Engineering Co. Inc., 601 Walnut St., Aurora, Ill.

Vacuum Lifting Devices Hold Nonporous Materials

FORK TRUCK HANDLING of barrels, plates, or sheets can be faster, safer, and more economical with the vacuum powered Vac-U-Lift attachment. The self-contained unit has four 10 in. vacuum pads mounted on a frame that slips onto truck forks. Lifting capacity of each 10 in. pad is 500 lb. Pads are available in 8, 12, or 16 in. sizes.

Vacuum power is supplied by an engine driven pump. A reserve vacuum system assures safety if the engine fails. You can also get similar units called Pad Pacs for use with other lifting devices.

For further information, *write* Vac-U-Lift Co., a division of Siegler Corp., Salem, Ill.

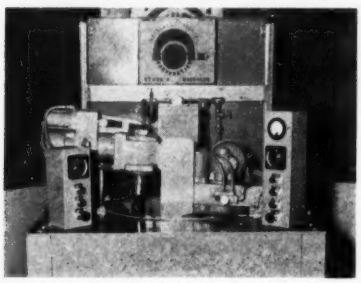


HYDRAULIC SURFACE GRINDER (No. 10H) has a 16½ in. vertical capacity from the 7 in. wheel to the table. You can get power elevation for rapid positioning of the grinding wheel. Cross feed range is infinitely variable from 0.005 to 0.25 in. with rapid traverse for dressing the wheel from the chuck or quick positioning the work. Other specifications include a 6 x 18 in. working surface, longitudinal table travel of 20 in., 7 in. traverse travel, and a hydraulic infinitely variable table drive of 10 to 70 fpm (or manual). For further information, **write** Covel Mfg. Co., Benton Harbor, Mich.

Deburring, Finishing Unit Has Two Spindle Heads

A FIXTURED deburring and finishing machine known as Mechamatic has two independently operated spindle heads. One spindle can be serviced while the opposite spindle is in process. The unit can be supplied with the spindle stations interlocked to pace the machine operator.

Parts are mounted on air operated spindle fixtures and are submerged in an abrasive fluid while rotating. Travel is about 2000 sfpm. At a 15 second cycle, the machine will produce 240 pieces at 100 per cent efficiency. Parts up to 6 in. in diameter can be handled.



For further information, *write* Mecha-Finish Corp., P. O. Box 308, Sturgis, Mich.

Inorganic Dry Lubricant Nontoxic, Nonflammable

A MULTIPURPOSE dry lubricant (EverLube 811) is a completely inorganic coating suitable for cryogenic use. It is nonflammable, nontoxic, and does not require an extreme temperature cure.

Laboratory tests show wear life that is superior to current dry lubricant standards for room temperature testing from −300 to 1000° F (at bearing loads up to 50,000 psi).

For further information, *write* Everlube Corp. of America, 6940 Farmdale Ave., North Hollywood, Calif.

Coil Cradles Help Coiled Metal Handling

THE 2000 J Series Easy Load coil cradles are designed to improve handling of all types of coiled metals. They're helpful when running troublesome narrow widths or light gages. Guide plates are located forward and above the coil center. The system eliminates side pressure on the coil's lower portion and permits fast, accurate feeding (to the press) without crimping or binding stock edges.

The four models in the series have maximum width capacities of

(*Please turn to Page* 126)

How Ralph Hockett increased diamond wheel life 72%

If ever a man was a perfectionist, that man is Glenn Carr, General Foreman of the Tool Grinding Department at the Wichita Division of the Boeing Airplane Company. And, after fifteen years of working to the kind of tolerances required by the world's leading builder of superbombers, he tends to be skeptical of miraculous claims.

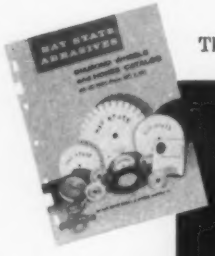
That's why Ralph Hockett of Bay State distributor Wichita Pump & Supply Co., didn't make much fuss about Bay State's new diamond wheels. He analyzed the problem in his usual fact-finding manner, submitted wheels for test and let them speak for themselves.

The result was an eye-opener. The pay-off was in wheel life. Against an average life of *125* hours previously, the new Bay State wheels averaged *215* hours per wheel!

One important factor contributing to this bonus wheel life was the use of Bay State's unique BA Resinoid bond.

The Bay State wheels were not only longer-lasting but they were more versatile, cooler cutting and gave a far superior finish. They are now, of course, a regular inventory item at Boeing, Wichita, where B-52 missile bombers are in production for the Air Force.

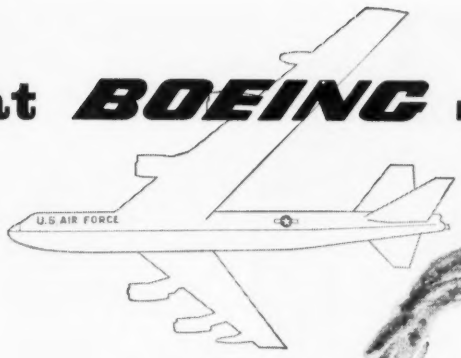
If you have a diamond-wheel grinding problem, you'll find that your Bay State representative, direct or distributor, is ready to supply the right wheel for the job with either natural or man-made diamond abrasive... and he may well be able to give you a significant improvement in performance, too. Better grinding at lower cost ... that is his business.



This new catalog, which includes pricing data, gladly sent on your request. Ask for Form 217.

Operator Harvey Johnson checks the finish on carbide-inserted tooth of a milling cutter after grinding with Bay State's 215-hour (average life) diamond cup wheel. Glenn Carr, General Foreman, checks Johnson's reading against blueprint.

at BOEING WICHITA



You don't get to know the aircraft business overnight and Ralph Hockett is the first to admit that he has never stopped learning. 27 years as an abrasive specialist, with 19 of them servicing Boeing on everything from the early B-17s on up, have given him what you might call a substantial background in the industry.

BAY STATE ABRASIVES

BAY STATE
WHEELS of PROGRESS

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Chicago, Cleveland, Detroit, Pittsburgh, Los Angeles. *Distributors:* All principal cities.

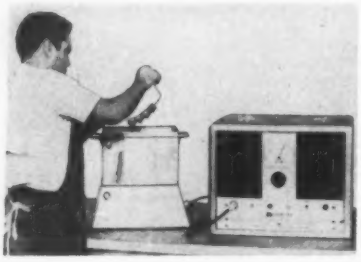
(*Concluded from Page* 123)

10, 15, 20, and 24 in. The series handles stock widths from 1 in. to the maximum cradle rating. Maximum weight rating is 2000 lb. Standard feed rate is 90 fpm (others are available).

For further information, *write* Rowe Machinery & Mfg. Co., 1508 N. Industrial Blvd., Dallas, Tex.

Ultrasonic Cleaners More Efficient, Powerful

UP TO three times more cleaning power for the same output is cited for the Acoustica ultrasonic cleaners. The unit's transducer design has the piezoelectric ceramic material compressed between two solid metal sections. That means increased ultrasonic cleaning power and durability, says the company. Efficiency rating of the transducer is 90 per cent.



You can select from three standard systems with tank capacities of 3, 5, and 10 gallons. Average power outputs of the models are 250, 500, and 1000 watts.

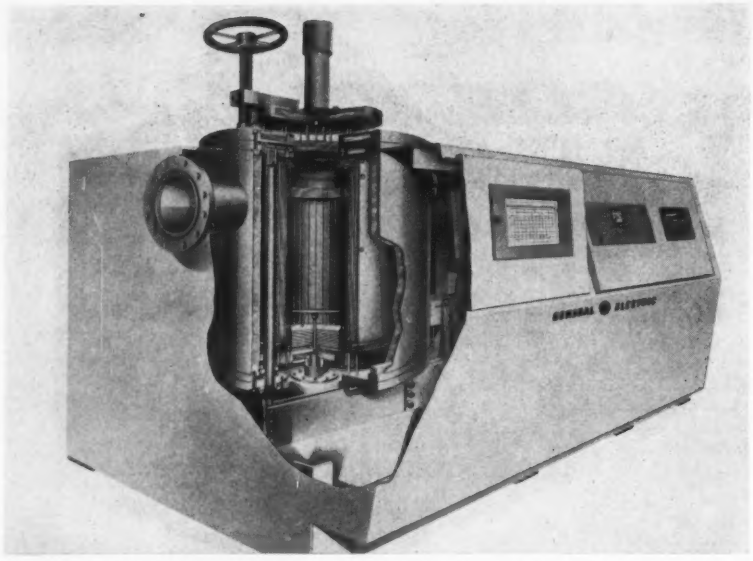
For further information, *write* Acoustica Associates Inc., Fairchild Court, Plainview, N. Y.

Light, Nonsilica Parting Powder Is Foundry Aid

A NONSILICA parting powder for use in foundry casting processes weighs nearly 60 per cent less than similar products, says the company. The powder (called Micro-Part) is chemically inert and can be used to part core and molding sand for all metals.

It's waterproofed, fine, and adheres to vertical surfaces of corebboxes and patterns made of wood, metal, plastic, and other materials. You can use it for sand to sand parting and for deep draws.

For further information, *write* Frederic B. Stevens Inc., a subsidiary of Udylite Corp., 1800 18th St., Detroit, Mich.



REFRACTORY FREE RADIATION SHIELD FURNACE does high temperature vacuum heat treating, brazing, and sintering. Maximum temperature is 4200° F. Parts or material up to 10 in. in diameter and 10 in. high can be processed. The console units are factory assembled, prewired, and prepiped. Only power, water, and vacuum system connections are required for installation. For further information, **write** General Electric Co., Schenectady 5, N. Y.

High Speed Vertical Motors Have High Starting Torque

HIGH speed, wound rotor, vertical motors are offered in 150 hp and up and in frames 584 and larger by Ideal Electric & Mfg. Co. A wide range of enclosures may be obtained.

The motors are suitable for applications requiring high starting and accelerating torques with low inrush current or adjustable speed control. In addition to standard A, B, and H insulations, you can specify silicone rubber, acrylic and epoxy resins, and other materials to meet unusual moisture, temperature, or chemical conditions. Coupling assemblies for your operational requirements are also obtainable.

For further information, *write* Ideal Electric & Mfg. Co., Mansfield 32, Ohio.

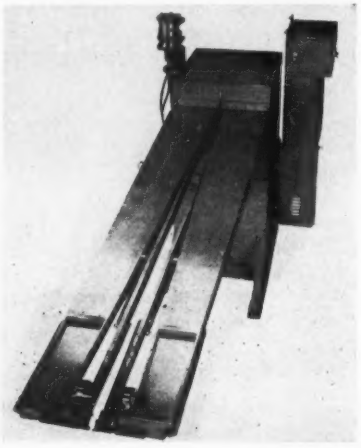
Dual Head Spotwelder Has 11 ft Reach

WELDING electrodes on this dual head spotwelder are on the extreme tip of the box section arms. Reach is 11 ft.

The arms may be set to operate in either the horizontal or vertical plane at a constant height. Here, they're set for a $\frac{3}{4}$ in. stroke and $\frac{1}{4}$ in. operating clearance. Pressure at the electrodes is 1200 to 1500 psi, obtained through Precision air-hydraulic boosters.

For further information, *write*

(*Please turn to Page* 131)

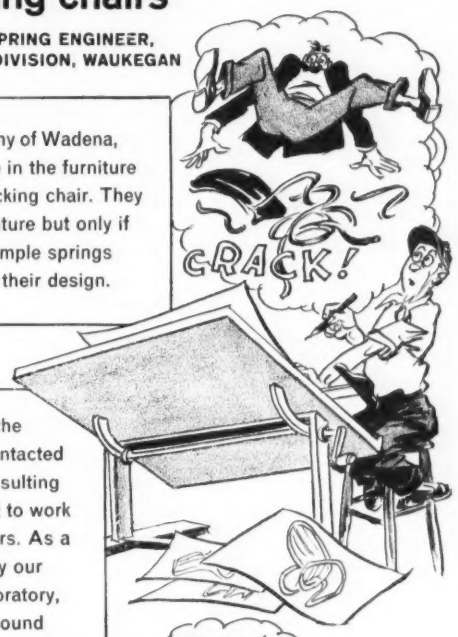


You get steel + plus from U.S. Steel

"Our steel spring recommendation helped sell 20,000 modern rocking chairs"

SAYS FRAN SMILEY, USS SPRING ENGINEER, AMERICAN STEEL & WIRE DIVISION, WAUKEGAN

"The Homecrest Company of Wadena, Minnesota, saw a place in the furniture market for a modern rocking chair. They wanted to make the venture but only if perfectly reliable and simple springs could be developed for their design.



"While the chair was still in the design stage, Homecrest contacted our Spring Engineering Consulting Service. Our engineers went to work with the Homecrest designers. As a result of many tests made by our Spring Fatigue Testing Laboratory, we recommended a pair of round wire helical single coil torsion springs.

RELAX!
THAT'LL HOLD THREE LIKE UNCLE ELBERT
THEY DON'T MAKE HORSES LIKE THEY USED TO
IT'S NOT THE HORSES... IT'S THOSE STEEL SPRINGS

"When Homecrest put the new rocking chairs on the market, the design soon got a reputation for strength and durability. Sales have totaled over 20,000 chairs . . . And there hasn't been one single report of a spring failure."

"Engineering assistance is only one of the U.S. Steel plus services."

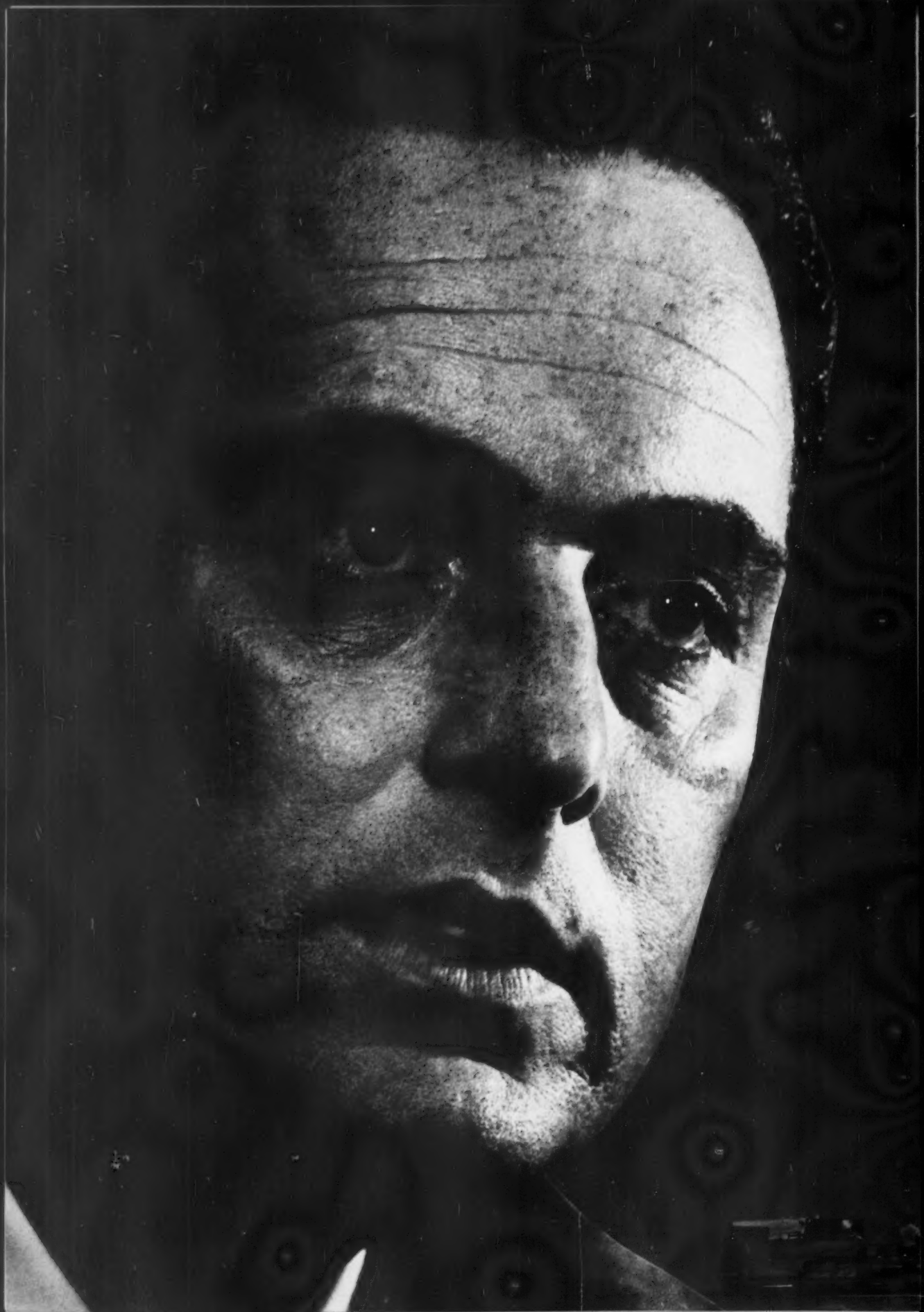
When you buy from U.S. Steel you get steel plus . . . technical assistance . . . research . . . facilities . . . marketing assistance.

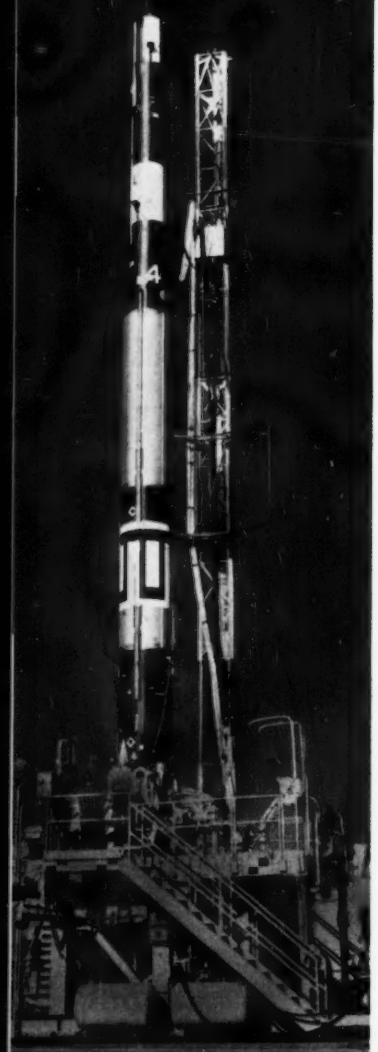
USS is a registered trademark

USS

United States Steel Corporation — Pittsburgh
American Steel & Wire — Cleveland
National Tube — Pittsburgh
Columbia-Geneva Steel — San Francisco
Tennessee Coal & Iron — Fairfield, Alabama
United States Steel Supply — Steel Service Centers
United States Steel Export Company

United States Steel





Clete Smith, who helped develop a special solvent formulation for flushing rocket fuel tanks, says you'll like doing business with Columbia-Southern

Technical Service Engineer Clete Smith is one of many Columbia-Southern specialists who recently teamed up to formulate a new solvent for cleaning rocket fuel tanks and other parts without damage to the special metals and alloys used in rocket construction.

Aimed at solving a specific customer problem, this product is one example of Columbia-Southern's emphasis on keeping customers' needs foremost. Throughout the company, the aim is to develop products and methods and to work closely with customers to insure the most effective use of Columbia-Southern chemicals—and service.

For example, Technical Service recommendations on vapor degreasing with Columbia-Southern Trichlor recently saved a large chain-saw manufacturer $2,100 in tank maintenance costs in just 22 weeks. And an analysis of a window-frame vapor degreasing set-up, also using Trichlor, resulted in a 30% reduction in solvent consumption.

These are just some of the reasons why so many companies in every industry find it pleasant—and profitable—to do business with Columbia-Southern. They like the extra service Columbia-Southern routinely delivers along with its quality products.

Anhydrous Ammonia, Barium Chemicals, Benzene Hexachloride, Calcium Chloride, Calcium Hypochlorite (Pittchlor®, Pittabs®), Carbon Tetrachloride, Caustic Potash, Caustic Soda, Chlorine, Chlorinated Benzenes, Chloro IPC, Chrome Chemicals, Hydrogen Peroxide, Muriatic Acid, Pacific Crystals, Perchlorethylene, Rubber Pigments (Calcene®, Hi-Sil®, Silene®), Soda Ash, Sodium Bicarbonate, Sodium Sulfate, Titanium Tetrachloride, Trichlorethylene

columbia southern
CHEMICAL CORPORATION
A Subsidiary of Pittsburgh Plate Glass Company • One Gateway Center, Pittsburgh 22, Pa.

got a special bolt problem?

here's why **SHEFFIELD** can help you

Whether your bolt need is run-of-the-mill or something special, call your Sheffield Man. He's experienced in bolts. And he is backed by one of the world's largest integrated bolt plants, where top engineers are ready to come up with the right answers to any bolt problem.

Behind these men stands a corps of quality control technicians who check and test Sheffield bolts through each step of manufacture from furnace to finished product. Finest production facilities assure you fast delivery.

There's a lot to like—and a lot to gain—in dealing with Sheffield. Next time, call in your Sheffield man.

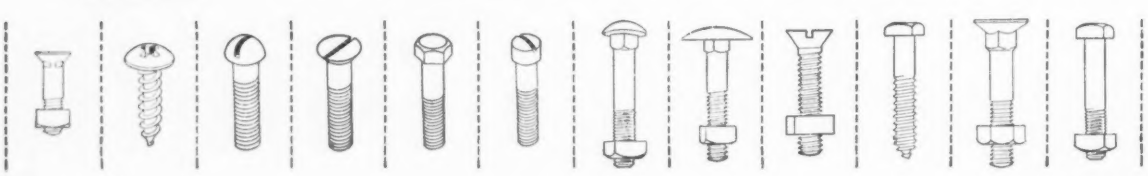
Bolt Makers Since 1888

SHEFFIELD DIVISION

ARMCO

ARMCO STEEL CORPORATION

OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products



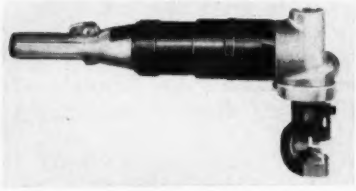
NEW PRODUCTS and equipment

(*Concluded from Page* 126)
Precision Welder & Flexopress Corp., 3518 Ibsen Ave., Cincinnati 9, Ohio.

Heavy Duty Nibbler Doesn't Distort Edges

THIS nibbler cuts through No. 8 gage mild steel or No. 10 gage stainless at 6 ft per minute. Both edges of the cut are distortion free, claims the maker.

Cuts may be started at the edge of the sheet or at an access hole. Minimum cutting radius is 5 in. The nibbler uses a high speed, vertical,

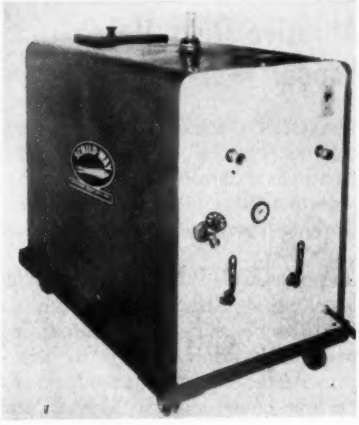


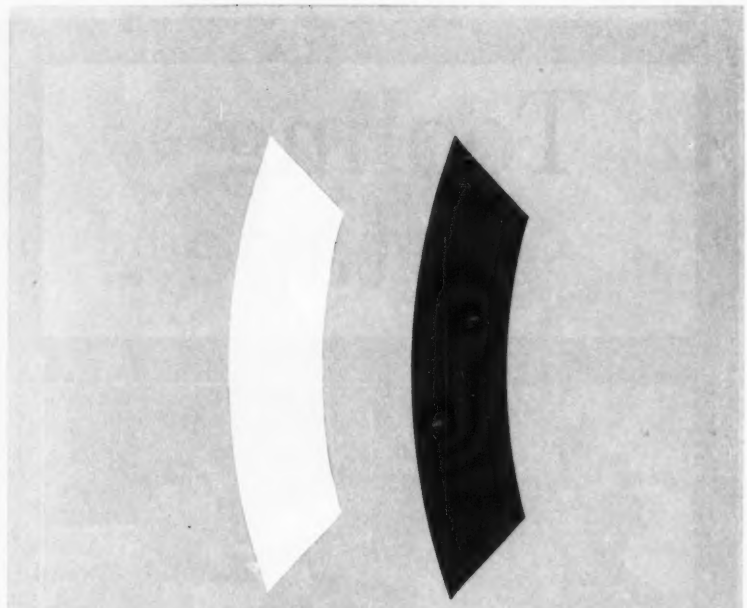
punching motion to take sharp rectangular bites (1/4 in. wide). The punch and die mechanism can be resharpened. Either air or electric powered versions can be ordered.

For further information, *write* Buckeye Tools Corp., 5003 Springboro Pike, Dayton 1, Ohio.

Portable Pressure Washer Cleans with 150 psi Spray

A PORTABLE, pressure washer sustains pressure at 150 psi and delivers a maximum of 3 gpm at the gun. Spray and forced displacement





Which looks bigger to you?

in buying blast cleaning abrasives, too, low price is just an illusion

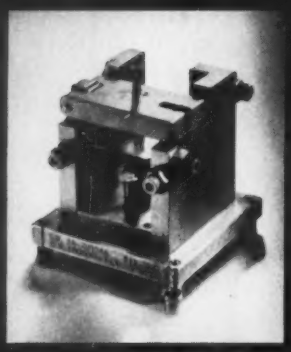
It's abrasive quality that really matters. Take hardness, for instance. Top quality Wheelabrator Steel Shot is the hardest steel shot ever made — almost 10 RC harder than lower priced steels. It hits harder, cleans faster, rebounds better to clean hard-to-reach areas. And it lasts much longer than softer abrasives.

For faster production and better finish — for *true* blasting economy, use high quality Wheelabrator Steel Shot. Prove it in your own equipment.

WRITE TODAY FOR THIS NEW HANDBOOK
of blast cleaning abrasive performance data, full of charts and facts to help you control abrasive consumption and cleaning costs. *Write to Wheelabrator Corp., 509 S. Byrkit St., Mishawaka, Ind. In Canada, write to Wheelabrator Corp., Canadian Div., P.O. Box 490, Scarborough, Ontario.*

WHEELABRATOR
STEEL ABRASIVES

Tooling with tape...

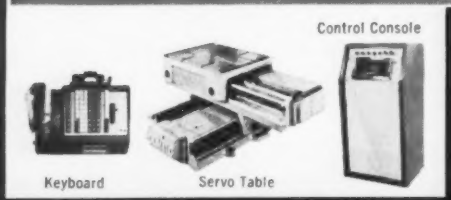


This drill jig: $280.00

This drill jig: $4.20

you can see the profit in point positioning with DIGIMATIC* model 202 Point-Positioning System

Ask us to arrange a demonstration with your parts.
Write for free 12-page booklet, "DIGIMATIC MODEL 202."
Also—movies shown at your shop or plant on request.



The lowest-cost complete point-positioning system for drilling, tapping, reaming, spot facing

*DIGIMATIC IS OUR TRADEMARK

STROMBERG-CARLSON
A DIVISION OF GENERAL DYNAMICS
1489 N. GOODMAN STREET • ROCHESTER 3, NEW YORK

NEW PRODUCTS and equipment

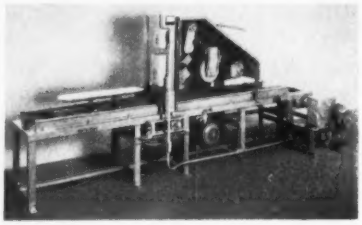
of cleaning solutions are controlled through the same trigger gun. No heat is required.

Cleaning applications include such things as cores, coils, and filters. One advantage: With the maker's runoff bags and sleeves you don't have to dismantle the equipment being cleaned.

For further information, *write* Pressure Wash Co., 2333 W. Wells St., Milwaukee 3, Wis.

Belt Head Grinds, Polishes Convex, Concave Surfaces

THE Murray-Way abrasive belt head can grind and polish convex or concave surfaces of aluminum, brass, and steel castings. An air operated scanning eye prevents belt runoff and allows a heavier cut.



Tension takeup is air controlled. The contact roll is supported by a sturdy outboard bearing arm, and an ammeter is provided to show work effort. A continuous chain reciprocates the platen mounted fixture.

For further information, *write* Murray-Way Corp., P. O. Box 180, Birmingham, Mich.

Abrasive Discs Have Longer Working Cycle

LONGER working cycles are claimed for the line of Michigan Red Coat abrasive discs. They're able to withstand greater periphery working pressures and minimize grain loss.

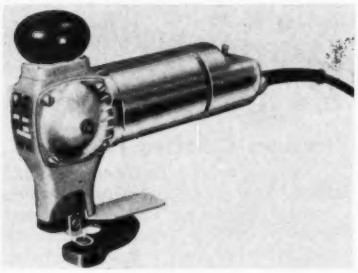
A special blanking method is used to eliminate structural changes in the fiber backing. An aluminum oxide abrasive is used. Grit sizes range from 80 and finer down to 16 for heavy duty cutting. You

can order standard diameters ranging from 5 to 9⅛ in. with ½ and ⅞ in. center holes.

For further information, *write* Michigan Abrasive Co., 11900 E. Eight Mile Rd., Detroit 5, Mich.

Electric Hand Shear Cuts Steel, Monel, Stainless

YOU can slice through No. 18 gage cold rolled steel at 30 fpm with this electric shear. Monel or stainless thicknesses up to 20 gage can also be handled.



The shear (Model No. 18) delivers 2500 cutting strokes per minute under full load. It requires only slight forward pressure and can follow pattern lines with the blade visible at all times.

For further information, *write* Black & Decker Mfg. Co., Towson 4, Md.

Output Speed Widens Gear Drive Applications

AN OUTPUT SPEED of 420 rpm is available in Moduline gear drives. The units are suitable for such applications as side entry agitators and permit the use of concentric gear motors in an output speed usually available only in offset shaft construction, says the company.

The total ratio of concentric shaft units using the new gear sets is 4.17:1 producing an output rpm of 420 with an input of 1750 rpm. When used with right angle output units, the output speed is 280 rpm with a total ratio of about 6.2:1.

For further information, *write* Westinghouse Electric Corp., P. O. Box 2088, Pittsburgh 30, Pa.

CAUSTIC SOLUTION

A CASE IN POINT—This is a 19 pound Ni-Resist valve body designed to handle caustic fluids at 400 psi. It was cast for the John Bean Division of Food Machinery & Chemical Corp. Ni-Resist is ideal for this application because it combines high corrosion resistance with superior resistance to erosion from high velocity fluids.

The intricate coring required demands unusual skill to produce Ni-Resist castings leak-proof at 400 psi operating pressures. Hamilton Foundry succeeded in producing pressure tight castings, an accomplishment difficult for the best of foundry men.

When new and unusual design problems arise in the selection of metal and the casting of parts, you will find that the skill and integrity of your foundry is your best insurance that specifications—and delivery schedules—will be met.

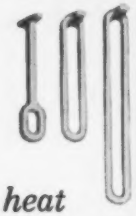
GRAY IRON • ALLOYED IRON • MEEHANITE® • DUCTILE (NODULAR) IRON • NI-RESIST • DUCTILE NI-RESIST • NI-HARD

HAMILTON FOUNDRY INC.

1551 LINCOLN AVENUE • HAMILTON, OHIO • TWinbrook 5-7491

SHELL MOLDED PARTS

corrosion resistant



heat resistant

abrasion resistant

DURASHEL

- *accuracy*
- *superior finish*
- *cut machining*
- *low cost*

We are equipped to help you pick the right alloy for planned service conditions...We are equipped to help you design your part to take advantage of the possibilities of shell molding...We are equipped to manufacture high alloy, shell molded parts to your specifications in quantity and on time!

We suggest you check on shell molding for your high alloy casting requirements. Write us today for additional information.

The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
ATLANTA OFFICE: 76—4th Street, N.W.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

NEW literature

Write directly to the company for a copy

Electronic Gaging

A 12 page brochure gives descriptions of electronic gaging systems and of each of the modules comprising them. Typical applications are shown. Industrial and Automation Div., Radio Corp. of America, 12605 Arnold Ave., Detroit 39, Mich.

Industrial Trucks

A 24 page booklet explains various lease plans offered purchasers of industrial trucks. A series of tables makes it easy to calculate the cost of leasing vs. purchase. Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.

Vacuum Tube Brazing Alloys

Bulletin 25 describes the high purity, low vapor pressure alloys which are required for klystron and magnetron tubes and electronic equipment. Handy & Harman, 82 Fulton St., New York 38, N. Y.

Ultrasonic Cleaning Primer

A 12 page booklet describes ultrasonic cleaning, how it works, areas in which it can be employed, and solvents and detergents used. National Ultrasonic Corp., 111 Montgomery Ave., Irvington, N. J.

Adhesive Bonding

"Adhesive Bonding of Aluminum" traces the development of adhesives and describes their advantages in modern applications. Dept. PRD-21, Reynolds Metals Co., Richmond 18, Va.

Speed Reducers

"In-Line Helical Gear Speed Reducers" provides data on 20 reducer sizes in double, triple, and quadruple reductions. Dept. PR, Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

Gas Welding Rods

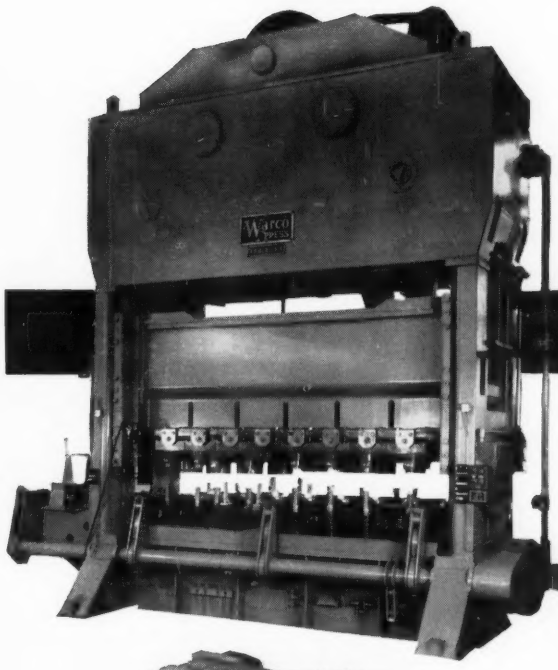
An 8 page bulletin, DH-1277-B, discusses gas welding rods, their analysis, recommended uses, welding procedure, and physical properties. Page Steel & Wire Div., American Chain & Cable Co. Inc., Monessen, Pa.

Offers Automation Plan

General Electric's "Ring of the Future" kit, GED-3893, contains: A guidebook to automation through modernization; a wall chart showing progressive steps to automation; several articles on modernization. General Electric Co., 1 River Rd., Schenectady 5, N. Y.

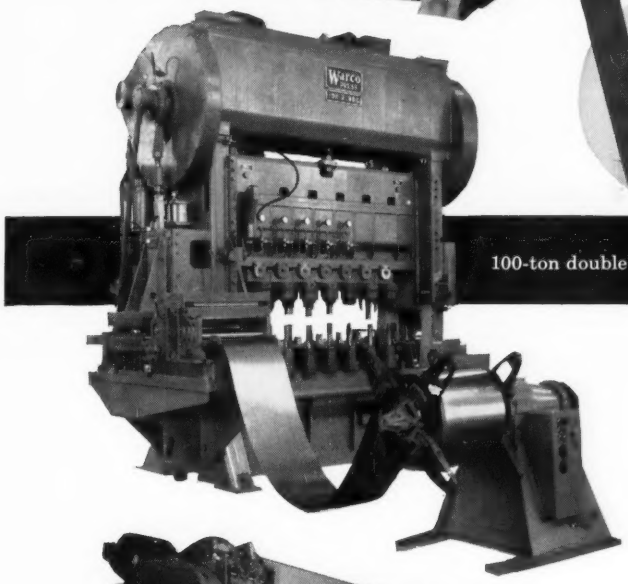
Charging Equipment

Bulletin AR-105 describes the AR-12-600 AutoReg charger which provides automatic single shift charging for 12 cell, 24 volt electric industrial truck batteries up to 600 ampere-hours capacity. C & D Batteries Inc., Washington and Cherry Streets, Conshohocken, Pa.



350-ton eccentric gear for automotive headlight housing.

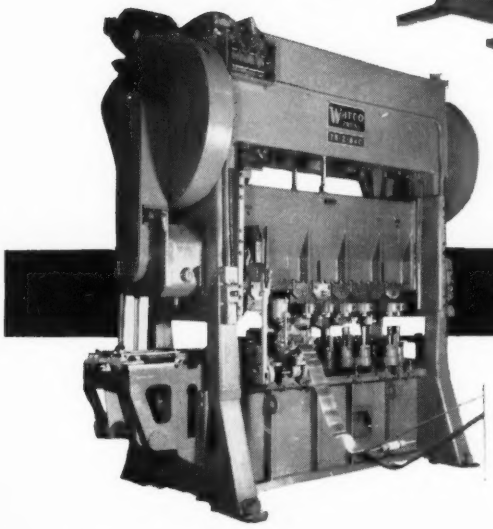
Warco®



100-ton double crank with outside blanking slide.

TRANSFER
FEED
PRESSES

To be absolutely sure you get modern . . . efficient . . . productive and profitable mechanical press operation . . . check with Warco engineers before you buy.



75-ton double crank for refrigeration parts.

The Federal Machine
and Welder Company
Warren • Ohio

Federal® WELDERS

Warco PRESSES®

PONTIAC fender, formed in a severe, one-hit drawing operation, is made of J&L drawing quality, cold rolled oiled sheet.

INTERNATIONAL HARVESTER utilizes the strength of J&L steel in rugged earth moving equipment manufactured by Construction Equipment Division.

E. F. HAUSERMAN COMPANY secures uniform flatness from coils of J&L sheet steel for its colorful, versatile movable wall partitions.

So easy to form, so flat, so strong, so uniform...

no wonder so many of America's leading manufacturers use

J&L sheet steel

TAKE PLANNED ADVANTAGE of the many services available through J&L Warehouse Division's 13 strategically located Steel Service Centers.

Modern production methods and styling make increasing demands on sheet steel:

It shouldn't deviate in strength or finish—auto makers must double draw steel into sweeping curves and deep contours.

It shouldn't buckle—appliance, office equipment and furniture manufacturers want wide, strong planes that need no bracing.

It shouldn't wear, break or corrode—heavy equipment builders want tough steels that stand the bounce of heavy boulders and the grinding of abrasive gravel.

To provide the steels that meet these requirements, J&L invested nearly $800 million in new equipment and facilities.

These include a new 46-inch, high lift blooming mill—a new automatic oxygen scarfer—a new 80-inch four-high reversing rougher—a new horizontal scale breaker—a new cold reducing mill—a new cold shear line—new annealing furnaces—a new 56-inch temper mill—a new 44-inch hot strip mill.

The result? J&L sheet steels are remarkably ductile, strong, flat—sheet after sheet after sheet.

You can see why so many of the things you use and enjoy every day are made of J&L steel.

Jones & Laughlin Steel Corporation

PITTSBURGH, PENNSYLVANIA

RCA WHIRLPOOL is a major user of consistent quality J&L sheet steel in these 24" washers produced in modern Clyde, Ohio, plant.

NOW BEING INTRODUCED by J&L, these colorful, plastic-clad steel containers are made of J&L zinc-coated sheets for patio, utility room or yard.

MODERNIZE NOW!

INCREASE PRODUCTION...

HOLD DOWN COSTS!

THE NEW

HARRIS BS-350 BALER-SHEAR

AUTO FRAMES and bulky scrap work through easily. The Harris Baler-Shear was designed to eliminate problems arising from the preparation of bulky scrap. It incorporates the principles of baling and shearing.

SPECIFICATIONS

size of charging box	264 x 83 x 41"
shear opening height	20"
shear opening width	36"
shear force	350 tons
floor space required	55' x 20'

HARRIS FOUNDRY & MACHINE CO.

Hydraulic Engineers Since 1889

CORDELE, GEORGIA

Talk with a Man from Harris

December Output May Set Record

LOOK FOR steelmakers to pour more ingots in December than they've ever produced in that month. If operations average 90 per cent of capacity—and that will probably be the minimum rate—production will be 11.3 million ingot tons. Biggest previous December output was in 1956 when 10.8 million tons were produced.

If operations average 93 per cent or higher in December, production will set an all-time monthly record, surpassing last May's 11.6 million tons.

INGOT RATE SOARS— Last week, steelmakers boosted their operations to 88 per cent of capacity—9.1 points above the previous week's revised rate. Production was about 2,492,000 ingot tons. November's output was 6.8 million tons. Total for 11 months: 81 million. Assuming a 90 per cent rate in December, the year's output will be about 92 million tons (see Page 57). It may reach 93 million.

FULL SPEED AHEAD— Although steelmakers were producing and shipping at high rates prior to the strike, they are almost sure to give a better account of themselves in December than they did in May or June (in ingot production, not shipments). For one thing, they're more concerned about supplying their customers. Today's buyers need steel for immediate consumption, not for strike protection.

Since almost all products are in peak demand, steelmakers know that they can use every ingot they can make. They can set up optimum schedules and roll to beat the band. Their freedom is limited only by defense priorities and the desire to supply as many customers as possible. To get maximum output, they're pressing marginal facilities into service—furnaces that were considered too costly for use earlier in the year.

USERS WANT VARIETY— Fearing that they'll be caught with unbalanced inventories if the steelworkers resume their strike, consumers want mill executives to shorten rolling cycles on bars, bar shapes, and structurals. If that were done, product variety would be increased, but steelmakers decline because frequent roll changes penalize tonnage.

AUTO SALES LOST?— Before the steel strike forced production cutbacks, automakers planned 1,925,000 fourth quarter assemblies. Now it looks like they'll complete only 1,180,000. Steel companies ship $250 to $300 worth of metal to automakers and their suppliers for every car that's built. On that basis, the loss of 745,000 assemblies will cut the steel industry's fourth quarter sales by as much as $224 million. Automakers fear that 250,000 prospective customers may refrain from buying new cars because the steel strike reduced their wages or forced them into debt.

FEAR NOT, MR. GOLDBERG— Arguing that the Commerce Department's steel priority system is "totally inadequate to protect the national safety," USW Counsel Arthur J. Goldberg urges the government to stockpile metal needed for defense. Uncle Sam is not about to do it. Reason: Government officials are confident that defense contractors will get enough steel during the injunction period to maintain normal operations through a brief (30 day) strike, and they don't believe a longer one will be tolerated. BDSA can't ask steelmakers to pull March or April orders back into January unless one of three agencies (AEC, NASA, or Defense Department) decides that such action is necessary.

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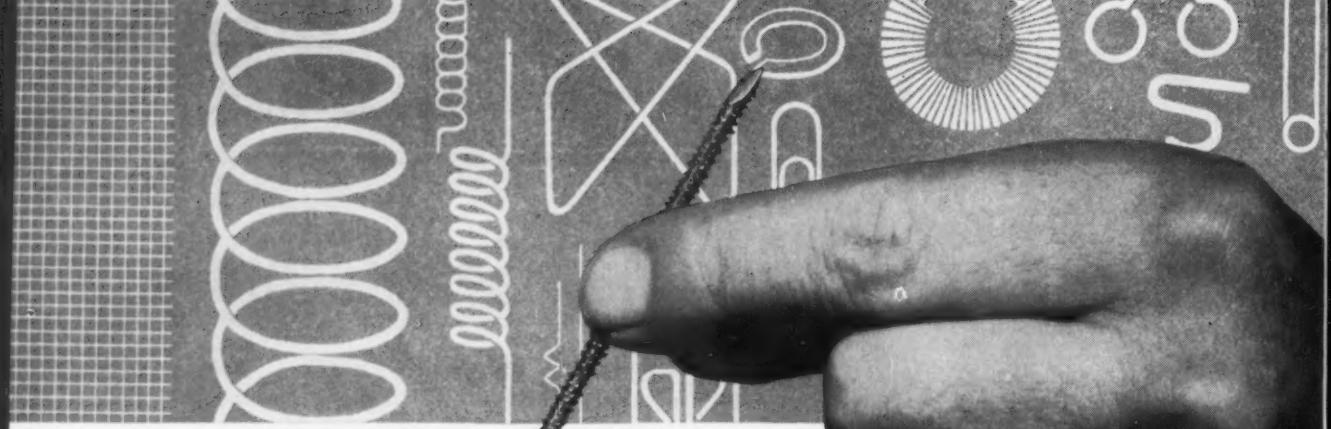
*Current prices were published in the Nov. 23 issue and will appear in subsequent issues.



this is a Nail!

It's a special kind of nail, knurled for greater holding ability and produced by machines which not only make nails, but at the same time drive and countersink them in leather or wood at rates up to three per second.

The wire used by these nailing machines must meet critical specifications. It must be ductile enough to form a perfect head and clinch when needed, yet be hard enough to penetrate tough grains and knots. Moreover, it must be consistent in quality throughout its length.

For 26 years, PAGE has supplied wire which meets exactly the requirements of the manufacturer of these machines—The Auto-Soler Company, Atlanta, Georgia.

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PAGE facilities are designed to produce a wide range of high quality manufacturers wire items—including special shapes. Where requirements are exacting, you will find PAGE wire unexcelled.

Since 1902, we have pioneered many "firsts" in the wire industry. The latest of these is corrosion-resistant ACCO *Aluminized* Wire—commercially pure aluminum bonded to a steel core.

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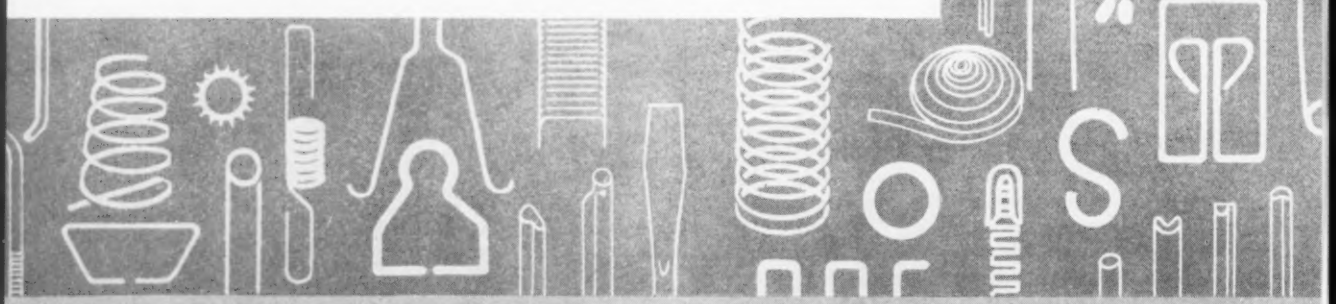


PAGE *-the source for answers to wire problems*

Selling rotisseries is part of stainless steel producers' . . .

Drive for Houseware Market

THE BIGGEST retail campaign ever staged to promote stainless steel consumer goods is being readied for 1960 by producers, suppliers, fabricators, and retailers.

Objective: A widening of the consumer goods market—estimated at $400 million in 1959. The promotion, scheduled for February, will be staged in 61 department stores, representing a total of 154 stores in downtown and suburban big city markets. The campaign will be about twice the size of the stainless steel industry's first "Gleam of Stainless Steel" promotion last year.

Closely related sales and advertising efforts will be implemented by the retail outlets, about 258 manufacturers of stainless steel consumer products, stainless steel producers, and International Nickel Co. Inc. Included in the drive will be such all-stainless products as kitchen cutlery, flatware, sinks, small electrical appliances, cookware, kitchenware and barbecue equipment. The Committee of Stainless Steel Producers of American Iron & Steel Institute will co-ordinate the marketing of its 18 member companies with participating stores.

• **Total Stainless Output** — The stainless steel industry hit all-time records for production and shipments in the first half. Shipments of 390,133 net tons were 71 per cent above those of the 1958 period; production of 739,764 tons was 95 per cent higher than the figure for first half of last year. Six month shipments to warehouses increased more than 90 per cent—from 79,596 tons in 1958 to 152,471 tons this year, reports the stainless producers' committee.

Shipments to the big consumer markets (appliances, utensils, and cutlery) rose from 17,247 tons in the first half of 1958 to 28,818 tons in the first half of this year.

• **Selling the Consumer** — "The houseware consumer is becoming increasingly material conscious," says Inco's vice president, L. R. Larson. "The modern consumer looks for materials that are easy to clean, won't tarnish or corrode, and that keep their good looks year after year."

For its part in selling the consumer, AISI's stainless steel committee has supervised the setting up of a number of "Stainless Steel Shops," permanent sales centers within large department stores. Working with the National Retail Merchants Association, the committee contacted 3500 houseware buyers and merchandisers in more than 2000 department stores.

The retail shops have paid off. Flatware sales in one case have tripled; hollow ware sales have quadrupled, says AISI. In one store, stainless houseware sales jumped 40 per cent in 90 days, rose 80 per cent in seven months. Furthermore, points out the committee, the retail shops serve as established centers for intensive special promotions. In dealing with the retailers, stainless steel companies supply "how to" films and trained personnel to help set up customer shops and displays.

Tool Steel . . .

Tool Steel Prices, Page 155

Vascoloy-Ramet Corp., Waukegan, Ill., has reduced prices on all premium grades of cemented car-

bides including VR-77, VR-75, VR-73, E-H, VR-87, and AW. All price differentials between grades have been eliminated. In additon, the company has reduced minimum catalog quantities (shown in its price list No. 3) from $800 to $500, allowing large quantity buyers to effect additional reductions on their purchases.

Another major producer of tool, die, and specialty steels, Latrobe Steel Co., Latrobe, Pa., has announced it has attained quantity production of a premium quality carburizing steel with properties meeting the specifications for critical jet engine parts.

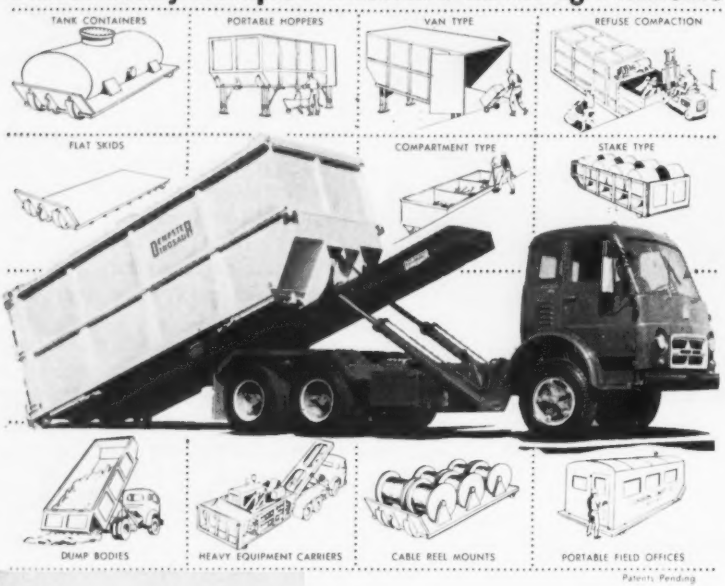
Prices on Imported Steel Are Expected to Go Down

There's some speculation in the Southwest that foreign mills may have to reduce steel prices soon or lose business to the domestic producers. With domestic production soaring, many buyers are hesitating about placing large orders for imported steel which will not be delivered until February or March.

Most imported items are $12 to $14 a ton under U. S. mill prices. With the domestic producers making a fast production comeback and the prospect of improved deliveries brightening, the price differential may not be enough to sway some buyers in favor of imported material. At the same time, many municipalities bar use of foreign steel in public works. (This factor alone is sufficient to hold down imported steel sales when American steel is readily available.)

Some market authorities expect a $5 to $8 a ton decline in foreign mill prices if the present steel labor dispute is settled. Brokers and speculators who hold considerable foreign tonnage in the area are expected to make a price retreat shortly.

One DINOSAUR With Detachable Containers . . . . Solves Many Complex Materials Handling Problems



Patents Pending

Here's the materials handling tool that takes up where the fork-lift truck leaves off. Gigantic loads can be placed on skids, in tanks or containers. The DEMPSTER-DINOSAUR picks them up . . . automatically . . . in seconds . . . and whisks them to their destination, in-plant or to over-the-road locations. Here they are put down, intact . . . pushed off on a dock . . . left on telescopic legs . . . or dumped.

One truck handles any number of containers of many types. Value of truck is multiplied . . . standing-idle time is eliminated . . . loading and handling is cut to the minimum. One man, the driver, handles the all-hydraulic operations without leaving the cab.

Containers available up to 40 cu. yds. and over . . . loads are limited only by the capacity of the truck. If you have a special problem send it in.

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DEMPSTER BROTHERS
Inc.
KNOXVILLE 17, TENN., DEPT. S-118

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 152

Orders on books of producers of reinforcing steel bars are reported good, but new demands are off seasonally, construction showing a definite tapering with the arrival of cold weather at many points throughout the nation. With highway construction down, the same also applies to road mesh.

Steel Bars . . .

Bar Prices, Page 151

Books of hot-rolled bar producers are pretty well filled through the first quarter of next year; they are accepting orders for second quarter shipment but not actively soliciting business that far ahead.

Despite pressure from consumers who want the mills to ship a wide variety of shapes and sizes before the Taft-Hartley injunction expires, barmakers are proceeding in an orderly fashion in handling orders.

"Any departure from established rolling cycles would mean chaos," a sales official points out. "We're aiming at maximum production, so we don't want to be bothered with a lot of time-consuming roll changes."

Producers say everybody will probably get something before another labor crisis develops, but probably no one will get as much tonnage as he wants. Past buying patterns will be the major factor in

determining who gets what and how much. In some instances, it will be possible for customers to change specifications on orders placed before the strike. This will enable them to get fairly prompt delivery of items that now appear to be more critical than those booked earlier.

The threat of another walkout in January has some Midwestern consumers worried about unbalanced supplies at that time—particularly bars, bar shapes, and structurals. Long rolling cycles mean only a limited number of sections and sizes can be turned out in a short period.

The rolling cycles for bars are about 60 days, and the mills assert they will not shorten them in the interest of increasing product variety.

Wire . . .

Wire Prices, Pages 153 & 154

The wire mills are pushing production, but demand is not as strong as it might be due to sluggish operations at automotive plants resulting from shortages of other steel products. A large amount of wire goes into auto seat springs, and shipments on auto account have been adversely affected. It'll be three or four weeks before shipments to the auto firms are resumed in large volume.

Demand for wire rods to replenish depleted stocks is heavy. Converters have substantial orders for finished wire, but they need rods to meet orders, particularly for specialties.

Northwestern Steel & Wire Co., Sterling, Ill., has booked 310 tons of zinc coated, annealed, carbon wire from the U. S. Engineer, San Francisco.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 152 & 153

Pressure on the sheet mills continues to mount. Ever since production was resumed three weeks ago, consumers have been pushing for deliveries. Their stocks are dangerously low. Some mill shipments are beginning to be received at supply-short manufacturing plants.

Users are pushing for extra tonnage. They also want to know precisely what they are going to get under their present orders and when they can expect to get it. Under the circumstances, the mills can't give much attention to forward ordering.

There is still considerable interest in conversion tonnage, particularly by the automotive industry. However, as the mills bring their operations up to capacity, there isn't much opportunity to do conversion rolling.

It's said that it will take the mills through the first quarter to catch up on arrearages in shipment of third quarter orders. Consequently, booking of any new tonnage is pretty academic. But customers are pressing for forward positions apparently fearing that the walkout may be resumed when the Taft-Hartley truce expires in January. It will be another month, though, before the major mills open their books for second quarter orders.

Producers of hot and cold rolled and galvanized sheets are booked well through May in some cases and

Versatility Unlimited

In the modern store MicroRold Stainless Steel adds elegance . . lessens maintenance

John Wanamaker store Wynnewood, Pa.

There's no compromise in quality and durability—when you select gleaming, *lifetime* stainless steel for buildings, storefronts and entrances. As a functional and decorative companion to wide glass areas, stainless steel is engineered to perform perfectly—year after year after year. The fact that stainless steel's beauty is permanent—and so easy to maintain—makes it the most practical choice in contemporary design.

Specify MICROROLD STAINLESS SHEET AND STRIP, available from local steel service centers in all architectural grades, thicknesses, finishes and textures. Send for your free copy, Bulletin 259, A.I.A. File 15-H-1, "ARCHITECTURAL STAINLESS ENGINEERING DATA."

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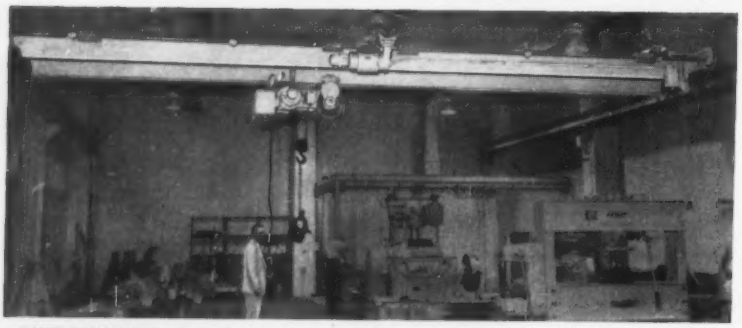
SHEPARD NILES

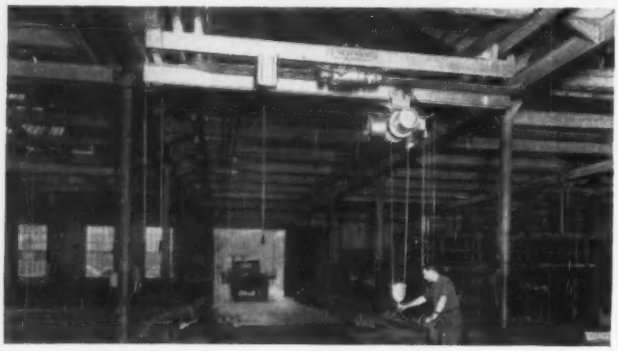
SINGLE BEAM CRANES

WHICH CRANE

. . . Over-running or Under-running?



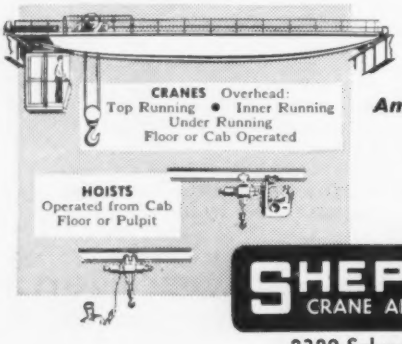
OVER-RUNNING where double beam cranes are not practical or for auxiliary service.



UNDER-RUNNING . . . for limited clearances . . . operating on runways hung from roof trusses!

Cut costly ground level handling. Move loads smoothly and safely overhead with Shepard Niles single beam cranes. Operate from floor or remote location. Push type or motor driven trolley type hoists, including close clearance units.

Send for Single Beam Crane bulletins today . . . or ask that a Shepard Niles representative call — there's NO OBLIGATION.



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America's Most Complete Line

of Cranes and Hoists

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CRANE AND HOIST CORPORATION

2389 Schuyler Ave., Montour Falls, N. Y.

are discouraging new orders for shipment beyond.

Tin Plate . . .

Tin Plate Prices, Page 153

Despite the steel strike, metal can shipments in September rose to 641,859 tons from 614,773 in August, and compared with 556,406 tons in September, 1958, reports the U. S. Census Bureau. Shipments in the first nine months this year were 3,949,353 tons vs. 3,707,038 in the like 1958 period.

The movement of fruit and vegetable cans totaled 262,897 tons vs. 300,939 in August and 262,005 in September a year ago. The total for the first nine months was 1,305,-204 tons vs. 1,271,024 in the same period last year.

Beer can shipments (second largest category) totaled 111,768 tons in the month vs. 95,427 in August and 68,583 in September last year. The total for the first nine months was 735,148 tons vs. 644,853 in the corresponding 1958 period.

Tubular Goods . . .

Tubular Goods Prices, Page 155

Fearing resumption of the strike after the Taft-Hartley injunction expires, major oil companies and drilling contractors are pressing tubemakers for quick deliveries. "They'll give us all the business we can handle if we promise to ship before Jan. 26," a Pittsburgh sales executive said last week. "If we can't make such a commitment, they shop around for a supplier who can."

Since producers have enough business on their books to support a comfortable rate of operations for four or five months, they aren't too concerned about the loss of rush orders.

Consumers' inventories are short and will almost certainly get shorter before new steel is being shipped in volume. The most needed tubular items are 2⅜ to 2⅞ in. OD tubing and 4½ and 5½ in. casing.

The oil producers haven't been forced to curtail production for lack of steel. They have been living off their own inventories and calling more frequently on distributors' stocks. Also, they have been getting shipments from mills that weren't struck, and they have purchased some foreign material.

There has been a lot of trading and long distance hauling. Case in point: One firm recently shipped pipe from a southern Lousiana field to a drilling site in Michigan.

Drill pipe demand shows signs of improvement, but users can still expect good deliveries. Most producers can ship new orders within three or four weeks. U. S. oil field drilling activity for the week ended Nov. 16 rose sharply. Hughes Tool Co. reported 2159 rotary rigs at work (an increase of 58 over the preceding week). In the like week a year ago, the figure was 2115.

Plates . . .

Plate Prices, Page 151

Plate mills are heavily booked ahead and under increasing consumer pressure for shipments. Orders for sheared plates are said to extend three to four weeks, on clad plates six to eight.

Orders that were accepted during the shutdown are being formally entered on mill books. Mills are booking new orders cautiously and giving defense requirements preference in rolling schedules.

Something like 1000 tons of plates will be required for tanks in the enlarged St. Regis paper mill plant under construction at Tacoma, Wash.

The chemical processing industry and railroad equipment builders are pushing for plates, in some cases with success. Pennsylvania Railroad, for instance, will be able to resume operations at its Altoona, Pa., shops by Nov. 30, a week ahead of schedule. The shops have been down since Nov. 2. Work will be started on the construction of 4300 freight cars left from an 11,800 car program. Some other eastern car shops are able to resume in moderate degree, one on components for cars to be sold from stock.

There is no particular pressure from shipbuilders or from the petroleum industry for large storage tanks. Fabricators of small oil tanks are not pushing for tonnage either, but all users are taking their quotas as fast as they become available.

One large producer of sheared plates is accepting tonnage for April shipment, but most sellers are making no commitments beyond the first quarter, and that means they

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the unprecedented launching complex for the TITAN intercontinental ballistic missile is fully protected, above ground and underground, with Zincilate
Artist's conception of Titan Launching Complex; Courtesy American Machine & Foundry Company.

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THOMSON TAKES EXTRA PAINS TO PREVENT FASTENING HEADACHES!
Statistical-quality control procedures **plus** 100% inspection give double assurance of close adherence to specified rivet dimensions and positive protection against interrupted production.

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are taking little in the way of new business until the situation becomes more clarified.

A burned out motor at the plant of the Coatesville, Pa., producer will suspend operations of its 206 in. mill for two to three weeks.

Semifinished Steel . . .

Semifinished Prices, Page 151

Steelmaking operations are rising at a faster pace than even the most optimistic expected. Last week the national ingot rate hit an estimated 88 per cent of capacity, up 75 points since three weeks ago when the Taft-Hartley truce reopened the mills, and the highest level of production since mid-June.

At 88 per cent of capacity, the furnaces are pouring steel at a weekly rate of 2,492,000 net tons.

Because new mills at one of the major plants in the Pittsburgh district aren't broken in, they aren't turning out as much tonnage as the mills they replaced. Result: Semifinished steel suppliers are having a hard time meeting their contract commitments. They have nothing to offer nonregular customers.

The rapid recovery in production —both semifinished steel and finished products—is largely attributable to excellent maintenance of equipment during the strike. Whether the production rate will continue to climb as rapidly from here on is uncertain. Almost every works has deferred maintenance that must be performed before equipment can be put back into service. This is said to be largely melting equipment, such as blast furnaces, open hearth, and electric furnaces.

Molding Compound Prices Reduced by Atlas Powder

Atlas Powder Co., Wilmington, Del., has announced a price reduction in the Thermaflow line of reinforced polyester molding compounds, and an increase in the number of colors available. In addition, a new quantity discount schedule has been made effective. It covers quantities between 9600 and 20,160 lb.

The largest price reduction (9 cents a pound) was made in Thermaflow 800, a glass reinforced compound. Thermaflow 105, a high impact general purpose compound, was reduced 1 to 2 cents a pound, depending on quantity.

Silicone Prices Reduced

Price reductions on silicone defoamers, greases, and greaselike dielectric compounds have been announced by Dow Corning Corp., Midland, Mich. The reductions range up to 30 cents a pound, and result from more economical volume production techniques. They vary from 5 to 8 per cent virtually across the board.

Prices Lowered on Large Oil Circuit Breakers

List price reductions ranging from 2½ to 27 per cent on large oil circuit breakers have been announced by Federal Pacific Electric Co., Newark, N. J. The reductions apply to the company's entire line of power circuit breakers rated from 14.4 kv, 100,000 kva through 230 kv, 20 million kva. Such equipment is used almost exclusively by electric utilities and heavy industry.

The lower prices are attributed to reduced manufacturing costs resulting from industry adoption of new ASA standards for high voltage entrance bushings, an important component of power circuit breakers, and economies effected by consolidating high voltage apparatus production at a new plant in Santa Clara, Calif.

Structural Shapes . . .

Structural Shape Prices, Page 151

Structural steel shipments to fabricating shops are not in sufficient volume or size ranges to straighten out disrupted operation cycles. Not until after the turn of the year will supplies of plain material support near-normal shop scheduling. Result: Delivery of fabricated material scheduled for next spring, including bridge volume, may be delayed.

Less volume is being estimated, and it's thought that there probably won't be much revival until steelworkers' contracts are signed. Industrial construction is almost 45

There's a Satisfied Customer back of most orders for

Diamond Perforated Metals

Naturally, we're always glad to make new friends and open up new accounts but, more and more as time goes on, the greater part of our business comes from concerns that have dealt with us before—some of them for nearly half a century.

One Reason is because they have learned that Diamond Perforated Metal Products are always reliable and our charges in line with competition of comparable quality. Another Reason is because our facilities are so complete, and our stock of dies so extensive, that almost any demand for perforated metal sheets, plates or parts can be taken care of promptly, accurately and economically.

ALL inquiries receive prompt attention. Illustrated catalogs give helpful working data—show many modern applications—enable you to select the best pattern for any purpose.

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Illustrated Bulletins describe DIAMONTEX Perforated Metal Lay-in Panels for Modern Acoustical Ceilings.

per cent below where it was last June. Many projects are on drawing boards, but many have been held back and will not be released for estimates until the labor situation is clarified.

Structural rolling and fabricating capacity is sufficient to meet pent-up demand when steel operations exceed 80 per cent of capacity for a sustained period. Then fabricating shops will be able to cut their backlogs. It's expected that shipments will be in excess of new bookings for some weeks.

West Coast fabricators are a little more active. Last week, more than 1000 tons were placed with Seattle shops, and bids were opened for about 5000 tons required for highway and public works projects in the area. Three missile launching projects in central Washington will take 3000 tons.

Bids will be called for shortly on the major construction phases of the proposed $25 million Fraser River Bridge at Port Mann, B. C. Tenders for the $5 million concrete subspan will be followed by bids for the $13 million steel superstructure. Two preliminary contracts have already been placed. Amount of steel required for the project has not been stated.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

10,000 tons, unit No. 8, Consolidated Edison Co., New York, to the American Bridge Div., U. S. Steel Corp., Pittsburgh.

2000 tons, office, Brooklyn Union Gas Co., Montague and Pierpont St., Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown Pa.

1890 tons, Milburn Shopping Center, Milburn, N. J., through John W. Ryan Construction Co., New York, general contractor, to Bethlehem Fabricators, Bethlehem, Pa.

705 tons, Public School No. 274, Brooklyn, N. Y., through Wilaka Construction Co., general contractor, to the Terry Construction Co., New York.

700 tons, also 100 tons of reinforcing bars, Idaho state underpass, Washington County, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Morrison-Knudsen Co. Inc., Boise, Idaho, general contractor at $638,177.

300 tons, addition to St. Regis Paper Co. plant, Tacoma, Wash., to Isaacson Iron Works, Seattle.

140 tons, state bridgework, Lehigh County, Pennsylvania, Kingston Contracting Co., West Point, Pa., general contractor; job will go prestressed concrete.

STRUCTURAL STEEL PENDING

9000 tons, powerhouse unit No. 5, Consolidated Edison Co., Astoria, Long Island, N. Y., bids closed Nov. 20.

5000 tons, reconstruction, Manhattan Bridge, Department of Works, New York, bids Dec. 16.

3000 tons, federal courthouse and office building, Brooklyn, N. Y., for General Services Administration, Washington, D. C.; bids Dec. 22.

3000 tons plus, three missile launching bases, central Washington State; MacDonald Construction Co., St. Louis, and associates, low at $31,600,722 to U. S. Engineer, Walla Walla, Wash.

2066 tons, state underpass, Nassau County, New York, Henrickson Bros., Valley Stream, Long Island, N. Y., low on the general contract.

1953 tons, state bridgework, TALIE 59-2, Nassau County, New York, A. E. Ottaviano, Croton-on-Hudson, N. Y., low on general contract.

1584 tons, Christie St. subway station, New York City Transit Authority, New York; Arthur Johnson & Co. low on the general contract.

1200 tons, two hangars, Andrews Air Force Base, Maryland, Arthur Vennere Co., Washington, D. C., low on the general contract.

1200 tons, two hangars, Andrews Air Force Base, Maryland, bids open Nov. 25; this is in addition to 1200 tons for two hangars there on which bids were recently opened.

940 tons, also 175 tons of reinforcing steel, Montana, Yellowstone River 730 ft. state highway bridge; W. R. Cahoon Construction Co., Pocatello, Idaho, low at $642,857.

800 tons (estimated), tower steel; Societa Anonima Electrificacione, Milan, Italy, apparently low at $246,215 to the Bonneville Power Administration, Portland, Oreg.; American Bridge Div., U. S. Steel Corp., Pittsburgh, bid $269,474 f.o.b. Pittsburgh.

773 tons, state bridgework, FARC 59-19, Erie County, New York, Steimm Associates, low on the general contract.

800 tons, jail buildings, Rickers Island, New York; bids Dec. 9.

700 tons, Nassau County executive building, Garden City, Long Island, N. Y.; bids Dec. 1.

500 tons, Baxter, office and warehouse building, Union, N. J.

392 tons, St. Francis Hospital, Wilmington, Del., William A. Berbusse Jr., New York, low on the general contract.

390 tons, state bridgework, FARC 59-133, Nassau County, New York, Lizza & Sons, Oyster Bay, Long Island, N. Y., low on the general contract.

315 tons, state bridgework, Bucks County, Pennsylvania, George M. Brewster & Son, Bogota, N. J., low on the general contract.

305 tons, terminal building, Hancock Air Port, Syracuse, N. Y., Vincent J. Smith, Syracuse, low on the general contract.

134 tons, FAC 59-18, Chenango County, New York, Les Strong Construction Co., Whitney Point, N. Y., low on the general contract.

150 tons, Seattle warehouse for U. S. Gypsum Co.; bids in.

135 tons, pipe supports, Du Pont plant, Beaumont, Tex., bids closed Nov. 27.

118 tons, state highway bridge, New Castle County, Delaware, bids Dec. 2.

100 tons, including miscellaneous steel; Cedar River Bridge; bids to Renton, Wash., Dec. 8.

REINFORCING BARS . . .

REINFORCING BARS PLACED

40 tons, Kenmore School, Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle; James I. Barnes Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

14,000 tons or more, three missile launching sites, Washington State; bids in.

1340 tons, also 45,363 ft of prestressed concrete girders, Washington State, Ravenna Blvd. crossing, Seattle; bids to Olympia, Wash., Dec. 8.

Unstated, Frenchman Hills and Hope Valley pumping plants, Columbia Basin project; bids soon to the U. S. Bureau of Reclamation, Ephrata, Wash.

Unstated, two water reservoirs, estimated to cost $141,450 and $267,900; bids to Port Angeles, Wash., Dec. 15; R. W. Beck & Associates, Seattle, engineer.

PLATES . . .

PLATES PENDING

1000 tons, estimated, digesters and tanks for enlarged St. Regis Paper Co. plant at Tacoma, Wash.; being designed by Boris R. Rubens, engineer, Seattle.

DISTRICT INGOT RATES

(Percentage of capacity engaged)

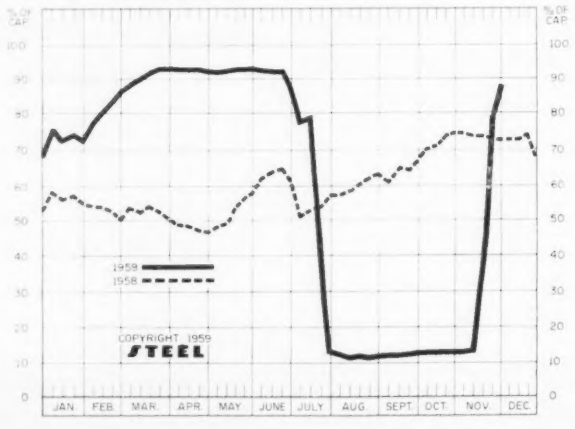
	Week Ended Nov. 29	Change	Same Week 1958	Same Week 1957
Pittsburgh	91	+13*	66.5	73
Chicago	90	+17*	85	74.5
Eastern	90	+10	71	82
Youngstown	98	+ 6	59	71
Wheeling	88	+ 0.5	83	61
Cleveland	86.5	+ 8.5*	71.5	66.5
Buffalo	100	+ 2.5	68.5	78
Birmingham	83	+ 5.5	60.5	63.5
Cincinnati	91.5	+ 3.5	85	81.5
St. Louis	102.5	+ 6.5*	92.5	87.5
Detroit	91	+15*	101.5	89
Western	82	+ 4	79	86
National Rate	88	+ 9.1*	74	73.5

INGOT PRODUCTION

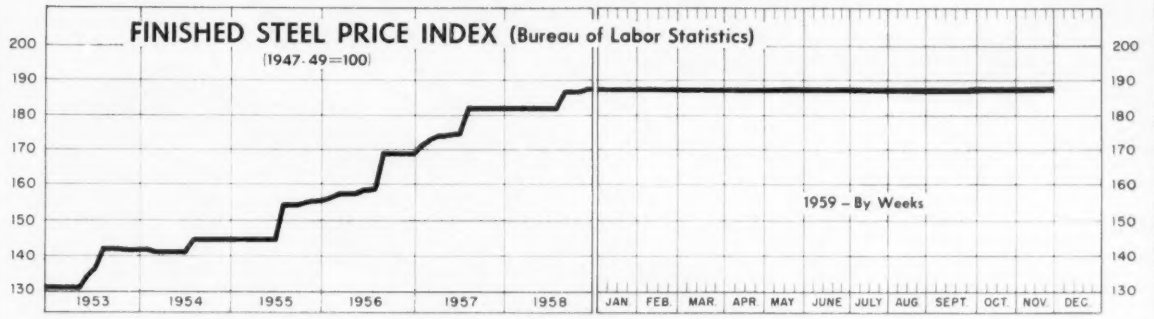
	Week Ended Nov. 29	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	155.1†	139.0	23.1	123.8
NET TONS (In thousands)	2,492†	2,233	371	1,988

*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.
Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Nov. 24, 1959	Week Ago	Month Ago	Oct. Index	Year Ago
186.8	186.8	186.8	186.8	186.9

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 17

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.735
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.420
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200	Black Plate, Canmaking Quality (95 lb base box)	7.900
Tubing, Mechanical, Carbon (100 ft)	27.005	Wire, Drawn, Carbon	10.575
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608	Wire, Drawn, Stainless, 430 (lb)	0.665
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800	Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.742
		Woven Wire Fence (20-rod roll)	21.765

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 25 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$117.95
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	43.50	44.83	44.33	40.33	33.08

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 25 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld. Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.00
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.60-5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

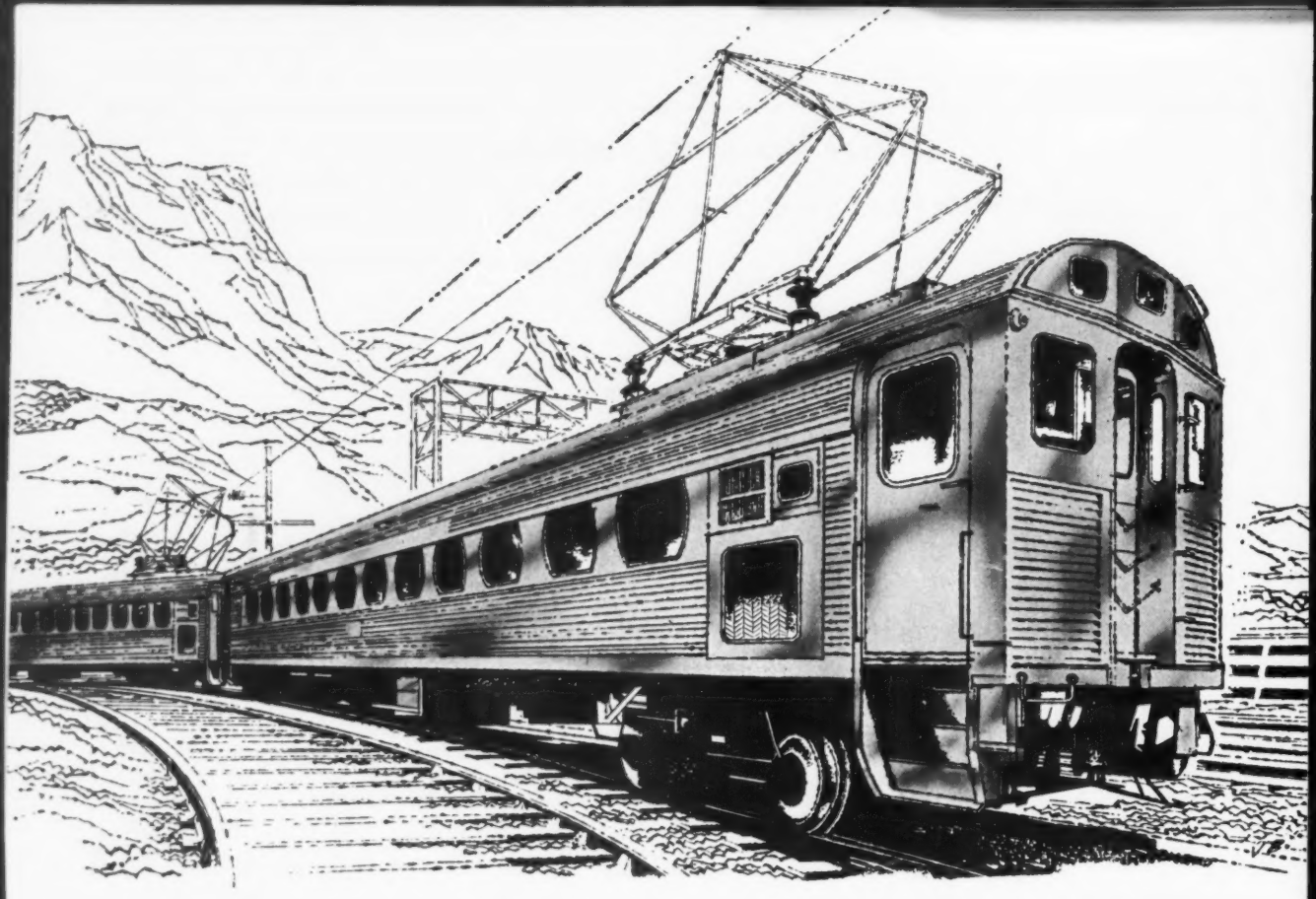
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods ⅜-⅝" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Nov. 25 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	50.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.85
No. 2 Fdry(Birm.)deld.,Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$41.50	$45.50	$44.50	$42.50	$33.50
No. 1 Heavy Melt, E. Pa.	45.00	45.00	45.00	36.00	32.25
No. 1 Heavy Melt, Chicago	44.00	44.00	43.50	42.50	33.50
No. 1 Heavy Melt, Valley	43.50	45.50	44.50	43.50	34.50
No. 1 Heavy Melt, Cleve.	40.50	42.50	41.50	40.00	32.50
No. 1 Heavy Melt, Buffalo	39.50	39.50	33.50	35.50	31.50
Rails, Rerolling, Chicago	64.50	64.50	64.50	62.50	54.50
No. 1 Cast, Chicago	57.50	57.50	57.50	45.50	39.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.25	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25



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Steel Prices

Mill prices as reported to STEEL, Nov. 25, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 152; footnotes, page 154.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)

Detroit S41 .....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ..80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 ....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ..140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 .....122.50

SKELP

Aliquippa,Pa. J5 .....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity, Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 .....6.40
Roebling,N.J. R5 .....6.50
S.Chicago Ill. R2 W14..6.40
SparrowsPoint,Md. B2..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ..5.55
Los Angeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14 5.50
S.SanFrancisco B3 ...6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange

Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ...8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling, Ill. N15 .....7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1 5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ...5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron

Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairtown,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.96
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 .....7.50

FLOOR PLATES

Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. c.l. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City Ala.(9) R2 ..5.675
Aliquippa,Pa. (9) J5 ..5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa. (9) U5 ..5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1 5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ...6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle A24, B3, N14..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 ..6.375
Warren O. C17 .....6.052
Youngstown(9) R2,U5 ..5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.275
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....8.30
Bessemer Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. R2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14 8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9)S5 ..5.925
Lackawanna(9) B2 ...5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon

LosAngeles P2, S30 ..11.75*

Alloy

Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12. 10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.85
Donora,Pa. A7 .....7.85
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ..7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2 9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ...7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ...7.65

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B2..9.025
LosAngeles P2, S30 ....11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ....9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ....6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 .6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ...7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00
McK.Rks.(S.R.) L5 ..14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa. (3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ...5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ...5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ...5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ...5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ..7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 ....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W. Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 ..6.275
Steubenville,O. W10 ..6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 ....9.275
Cleveland J5, R2 ....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2.6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C-16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10(type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ..8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Follak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Younstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2	5.10
Allenport, Pa. P7	5.10
Alton, Ill. L1	5.30
Ashland, Ky. (8) A10	5.10
Atlanta A11	5.10
Bessemer, Ala. T2	5.10
Birmingham C15	5.10
Buffalo (27) R2	5.10
Conshohocken, Pa. A3	5.15
Detroit M1	5.10
Ecorse, Mich. G5	5.10
Fairfield, Ala. T2	5.10
Farrell, Pa. S3	5.10
Fontana, Calif. K1	5.825
Gary, Ind. U5	5.10
Ind. Harbor, Ind. I-2, Y1	5.10
Johnstown, Pa. (25) B2	5.10
Lackaw'na, N.Y. (25) B2	5.10
LosAngeles (25) B3	5.85
LosAngeles C1	8.60
Minnequa, Colo. C10	6.20
Riverdale, Ill. A1	5.10
SanFrancisco S7	6.60
Seattle (25) B3	6.10
Seattle N14	6.60
Sharon, Pa. S3	5.10
S. Chicago, Ill. W14	5.10
S. SanFrancisco (25) B3	5.85
SparrowsPoint, Md. B2	5.10
Torrance, Calif. C11	5.85
Warren, O. R2	5.10
Weirton, W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18	8.40
Farrell, Pa. S3	8.40
Gary, Ind. U5	8.40
Houston S5	8.65
Ind. Harbor, Ind. Y1	8.40
KansasCity, Mo. S5	8.65
LosAngeles B3	9.60
Lowellville, O. S3	8.40
Newport, Ky. A2	8.40
Sharon, Pa. A2, S3	8.40
S. Chicago, Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10	7.575
Bessemer, Ala. T2	7.575
Conshohocken, Pa. A3	7.575
Ecorse, Mich. G5	7.575
Fairfield, Ala. T2	7.575
Farrell, Pa. S3	7.575
Gary, Ind. U5	7.575
Ind. Harbor, Ind. I-2, Y1	7.575
Lackawanna, N.Y. B2	7.575
LosAngeles (25) B3	8.325
Seattle (25) B3	8.575
Sharon, Pa. S3	7.575
S. Chicago, Ill. W14	7.575
S. SanFrancisco (25) B3	8.325
SparrowsPoint, Md. B2	7.575
Warren, O. R2	7.575
Weirton, W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10	5.35
Warren, O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn, Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover, O. G6	7.425
Evanston, Ill. M22	7.525
Farrell, Pa. S3	7.425
Follansbee, W.Va. W10	7.425
Fontana, Calif. K1	9.20
FranklinPark, Ill. T6	7.525
Ind. Harbor, Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport, Pa. E10	7.525
NewBedford, Mass. R10	7.875
NewBritain, Conn. S15	7.875
NewCastle, Pa. B4, E5	7.425
NewHaven, Conn. D2	7.875
NewKensington, Pa. A6	7.425
Pawtucket, R.I. R3	7.975
Pawtucket, R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale, Ill. A1	7.525
Rome, N.Y. (32) R6	7.425
Sharon, Pa. S3	7.425
Trenton, N.J. (31) R5	8.875
Wallingford, Conn. W2	7.875
Warren, O. R2, T5	7.425
Worcester, Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie, Pa. S18	15.55
Cleveland A7	15.55
Dover, O. G6	15.55
Farrell, Pa. S3	15.55
FranklinPark, Ill. T6	15.55
Harrison, N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville, O. S3	15.55
Pawtucket, R.I. N8	15.90
Riverdale, Ill. A1	15.55
Sharon, Pa. S3	15.55
Worcester, Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn, Mich. S3	10.80
Dover, O. G6	10.80
Farrell, Pa. S3	10.80
Ind. Harbor, Ind. Y1	10.80
Sharon, Pa. S3	10.80
Warren, O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	8.95	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. (32) R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford, Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria, O. S1	19.05	22.15	....
FranklinPark, Ill. T6	19.20	23.30	28.15
Harrison, N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer, Mass. W12	18.85	....	....
Trenton, N.J. R5	18.85	22.95	27.80
Worcester, Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.20	9.45	9.85
Fairless, Pa. U5	9.20	9.45	9.85
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity, Ill. G4	9.20	9.45	9.60
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Weirton, W.Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa, Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor, Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles, O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.50	10.75
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Ind. Harb. Y1	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W.Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)	
Aliquippa, Pa. J5	$8.20
Fairfield, Ala. T2	8.30
Fairless, Pa. U5	8.30
Fontana, Calif. K1	8.85
Gary, Ind. U5	8.20
GraniteCity, Ill. G4	8.30
Ind. Harbor, Ind. I-2, Y1	8.20
Irvin, Pa. U5	8.20
Niles, O. R2	8.20
Pittsburg, Calif. C11	8.85
SparrowsPoint, Md. B2	8.20
Weirton, W.Va. W6	8.20
Yorkville, O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa, Pa. J5	7.85
Gary, Ind. U5	7.85
GraniteCity, Ill. G4	7.95
Ind. Harbor, Ind. Y1	7.85
Irvin, Pa. U5	7.85
Yorkville, O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary, Ind. U5	$10.05
Irvin, Pa. U5	10.05
Weirton, W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2	8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	7.425*
Dover, O. G6	7.425*
Evanston, Ill. M22	7.525*
McKeesport, Pa. E10	7.50*
Riverdale, Ill. A1	7.525*
Warren, O. B9, S3, T5	7.425*
Worcester, Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell, Pa. S3	7.50
Sharon, Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell, Pa. S3	5.525
Riverdale, Ill. A1	5.675
Sharon, Pa. S3	5.525
Youngstown U5	5.525

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift, Pa. U5	8.10
Mansfield, O. E6	8.10
Warren, O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	..	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2	8.00
Aliquippa, Pa. J5	8.00
Alton, Ill. L1	8.20
Atlanta A1	8.00
Bartonville, Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville, Ind. M8	8.10
Donora, Pa. A7	8.00
Duluth A7	8.00
Fairfield, Ala. T2	8.00
Fostoria, O. (24) S1	8.10
Houston S5	8.25
Jacksonville, Fla. M8	8.35
Johnstown, Pa. B2	8.00
Joliet, Ill. A7	8.00
KansasCity, Mo. S5	8.25
Kokomo, Ind. C16	8.10
LosAngeles B3	8.95
Minnequa, Colo. C10	8.25
Monessen, Pa. P7, P16	8.00
Palmer, Mass. W12	8.30
Pittsburg, Calif. C11	8.95
Portsmouth, O. P12	8.00
Rankin, Pa. A7	8.00
S. Chicago, Ill. R2	8.00
S. SanFrancisco C10	8.95
SparrowsPoint, Md. B2	8.10
Sterling, Ill. (1) N15	8.00
Sterling, Ill. N15	8.10
Struthers, O. Y1	8.00
Waukegan, Ill. A7	8.00
Worcester, Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria, O. W8	8.00

Wire, Gal'd., for ACSR

Bartonville, Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora, Pa. A7	12.65
Duluth A7	12.65
Johnstown, Pa. B2	13.40
KansasCity, Mo. U3	12.90
Minnequa, Colo. C10	12.775
Monessen, Pa. P7, P16	12.65
Muncie, Ind. I-7	13.60
NewHaven, Conn. A7	12.95
Palmer, Mass. W12	13.70
Pittsburg, Calif. C11	13.45
Portsmouth, O. P12	12.65
Roebling, N.J. R5	12.95
SparrowsPt., Md. B2	13.50
Struthers, O. Y1	13.40
Trenton, N.J. A7	12.95
Waukegan, Ill. A7	12.65
Worcester, Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5	9.75
Alton, Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora, Pa. A7	9.75
Duluth A7	9.75
Johnstown, Pa. B2	9.75
KansasCity, Mo. S5, U3	10.00
LosAngeles B3	10.70
Minnequa, Colo. C10	9.95
Monessen, Pa. P7, P16	9.75
NewHaven, Conn. A7	10.05
Palmer, Mass. W12	10.05
Pittsburg, Calif. C11	10.70
Portsmouth, O. P12	9.75
Roebling, N.J. R5	10.05
S. Chicago, Ill. R2	9.75
S. SanFrancisco C10	10.70
SparrowsPt., Md. B2	9.85
Struthers, O. Y1	9.75
Trenton, N.J. A7	10.05
Waukegan, Ill. A7	9.75
Wor'ster, Mass. A7, J4, T6	10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1	16.50
Bartonville, Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville, Ind. M8	16.40
Fostoria, O. S1	16.30
Houston S5	16.55
Jacksonville, Fla. M8	16.65
Johnstown, Pa. B2	16.30
KansasCity, Mo. S5	16.55
Kokomo, Ind. C16	16.30
Minnequa, Colo. C16	16.55
Monessen, Pa. P16	16.30
Muncie, Ind. I-7	16.50
Palmer, Mass. W12	16.60
S. SanFrancisco C10	17.15
Waukegan, Ill. A7	16.30
Worcester, Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville, Ill. K4	17.15
Monessen, Pa. P16	17.15
Roebling, N.J. R5	17.65

ROPE WIRE (A)

Bartonville, Ill. K4	13.45
Buffalo W12	13.45
Fostoria, O. S1	13.45
KansasCity, Mo. U3	13.70
Johnstown, Pa. B2	13.45
Monessen, Pa. P7	13.45
Muncie, Ind. I-7	13.65
Palmer, Mass. W12	13.75
Portsmouth, O. P12	13.45
Roebling, N.J. R5	13.75
St. Louis L8	13.45
SparrowsPt., Md. B2	13.55
Struthers, O. Y1	13.45
Worcester, Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler

(14½ Ga.)(per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.34

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.28
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.64

Coil. No. 6500 Interim	
AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.69

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2.	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)

	An'ld Galv.	Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville B8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant quality

(6 to 8 gage)	An'ld Galv.	
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48)A11	9.10	9.775§
Bartonville(48) K4	9.10	9.80
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48) S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48) N15	9.10	9.80
Struthers,O. Y1	9.00	9.65†
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50. †5c. $10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1⅛ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts

Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Large diameters and longer lengths	35.0

High Tensile Structural Bolts (Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated. Spec. (ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam	50.0
¾ in. diam	47.0
⅞ and 1 in. diam.	43.0
1⅛ and 1¼ in. diam	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy

Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1½ in. incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS (Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:

⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:

6 in. and shorter:

⅝ in. and smaller	20 0
¾, ⅞, and 1 in.	+ 5.0
Longer than 6 in.:	
⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter . . +85.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam:

6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85 7/8 in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Pueblo,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

RAILWAY MATERIALS

	Standard			Tee Rails
Rails	No. 1	No. 2	All No. 2	60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon Pa. B2	15.35
Minnequa Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) 8½" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c. for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.75	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	—Plates— 5%	Carbon Base 10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
*Copper**	*$36.80*	*$44.20*

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

—— Grade by Analysis (%) —— W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpeville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.03-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no change.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59‖	9.86‖	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	9.80[a]	10.00[b]	9.99	....	11.45[c]	10.05[d]	11.80#	16.38	9.55	9.90[e]	10.50
Birmingham	9.43[a]	10.20[b]	....	....	10.91[c]	9.59[d]	13.14#	16.76	9.00	9.79[e]	10.90
Boston	10.07	11.42	11.92	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.53
Cleveland	8.54[a]	8.79[b]	10.87	52.33	10.32[c]	8.75[d]	11.25#	15.16	9.39	8.71[e]	10.50[f]
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	9.65[a]	9.65[b]	....	52.00	10.85[c]	8.90[d]	13.10#	16.55	8.35	9.65[e]	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.82[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.30	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.61	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.54[a]	8.79[b]	10.76	52.33	10.30[c]	8.64[d]	11.25#	15.05	9.00	8.47[e]	10.26[f]
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.80[a]	9.31[b]	10.47	....	10.32[c]	8.70[d]	11.49#	16.54	9.38	8.60[e]	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[2]	10.20	10.10	12.50
South'ton, Conn.	9.67	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

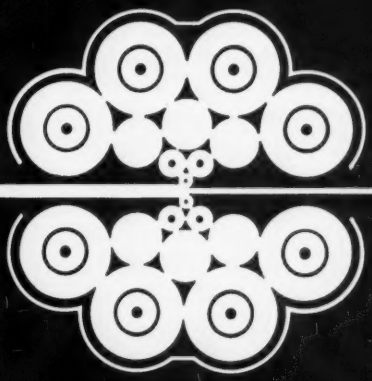
*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; ‖2 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡⅝ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.
[a]10 Ga.; [b]20 Ga.; [c]⅛ x 1 in.; [d]¾-2½ in.; [e]¼ x 84 in.; [f]¼ x 36 in.
Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [5]—1000 to 4999 lb; [10]—2000 lb and over.

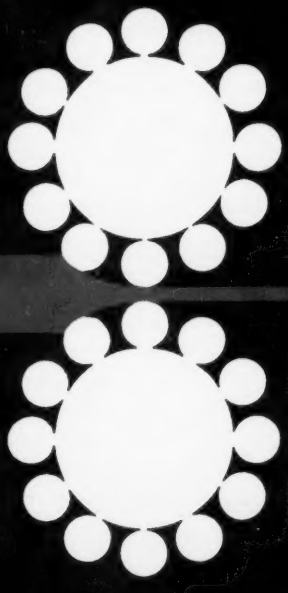
COLD MILLS

THE WATERBURY FARREL FOUNDRY & MACHINE CO.

DIVISION OF TEXTRON INC. Waterbury, Conn. U.S.A.

Branch Offices: Chicago • Cleveland • Los Angeles • Millburn, N. J.





PLANETARY MILLS

T. SENDZIMIR, INC.

Waterbury 12, Conn. U.S.A.

London • Paris • Stockholm

Tokyo • Sao Paulo • Buenos Aires

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo. Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Ft. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thorton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid $26.50-$27; barge, Brownsville, Tex., $29-$29.50.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping seanson, subject to later revision, gross ton. 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$16.00-$16.50*
Domestic, concentrates f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.00†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon, Forging Quality (net ton)	$97.00
Alloy (net ton)	115.00
Wire Rods:	
Carbon, $\frac{7}{32}$" to under ⅛ in.	5.30
Carbon, ⅛ in. to 47/64 in.	5.70
Alloy	6.40
Wire (carload lots)	8.40
Bars & Small Shapes:	
Carbon, merchant quality	5.40
Carbon, special quality	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Structural Size Angles & Zees	5.40
Plates:	
Carbon	5.45
Sheets & Coils, Hot Rolled:	
Carbon Sheets	5.00
Carbon Strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon Sheets	6.35
Carbon Strip (0.080 and lighter)	6.35
Carbon Strip (0.081 and heavier)	6.65
Sheets & Coils, Galvanized:	
Standard Quality	6.70
Culvert Quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field Grade	9.00
Armature Grade	9.50
Electrical Grade	10.15
Tin Mill Products (Per Base Box; 100 lb basis wt)	
Coke Tin Plate (1.25 lb pot yield)	$10.60
Electrolytic Tin Plate (0.25 lb coating)	9.10
Black Plate	8.30
Nails, c.l. lots, (per keg) **400 keg min.**	$8.15

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85§
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe.	36.75
Unannealed (99+% Fe)	33.25
Unannealed (99+% Fe) (minus 325 mesh)	58.25
Powder Flake (minus 16 plus 100 mesh).	29.25
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum, freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 500-lb lots	35.70-52.20†
Bronze, 5000-lb lots	53.50-57.50†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	54.00-58.30†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	46.50-55.00
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89.00*
Stainless Steel, 316	$1.07
Tin	14.90*
Zinc, 5000-lb lots	20.70-33.90‡
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	Dollars nom**
Chromium electrolytic 99.8% Cr, min, metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, oven	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.60	....	$6.55	$6.46	$6.95
Bar Size Angles	6.60	....	6.55	6.46	6.95
Structural Angles	5.93	....	5.88	5.78	6.18
I-Beams	5.93	....	5.88	5.78	6.18
Channels	5.93	....	5.88	5.78	6.18
Plates (basic bessemer)	6.30	....	6.25	6.15	6.55
Sheets, H.R.	9.50	....	9.45	9.35	9.75
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	10.40	....	10.35	10.25	10.75
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	10.55	....	10.50	10.40	10.80
Sheets, C.R. (drawing quality)	12.00	....	12.95	12.85	13.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.50	....	25.28	24.99	26.68
Barbed Wire (†)	8.25	....	8.20	8.10	8.50
Merchant Bars	6.58	....	6.53	6.44	6.81
Hot-Rolled Bands	9.90	....	9.85	8.75	10.15
Wire Rods, Thomas Commercial No. 5	6.40	....	6.40	6.25	6.60
Wire Rods, O. H.	6.90	....	6.90	6.75	7.10
Bright Common Wire Nails (‡)	9.00	....	9.05	8.95	9.35

*Books closed for 1959-60 shipping season. †Per 82 lb net reel. ‡Per 100-kegs, 20d nails and heavier.

Coal Chemicals

(Representative prices)

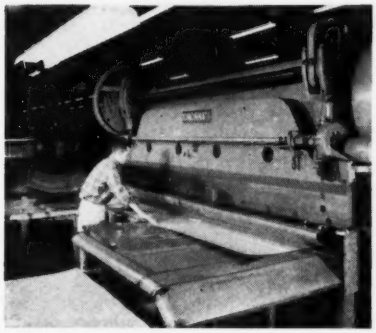
Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	5.00
Toluene one deg (deld. east of Rockies).	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

O-KNI-CO

MACHINE TOOL news

PRODUCTION FACTS THAT INCREASE YOUR PROFITS

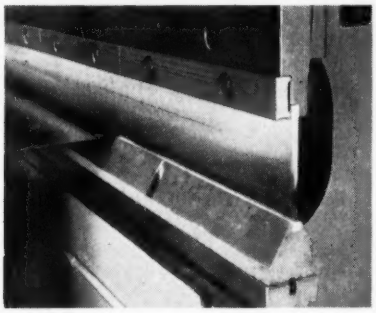
PUBLISHED BY THE OHIO KNIFE CO., CINCINNATI, OHIO



65 ton Cincinnati Press Brake equipped with long-wearing O-KNI-CO processed shear blades.

Press Brakes built by Cincinnati Shaper for shearing laminated plastics, equipped with shear blades made by Ohio Knife Co.

To eliminate cracked or "crazed" edges when cutting laminated plastic, four press brakes with a 65 ton bending capacity were built by The Cincinnati Shaper Co. Shear blades made by The Ohio Knife Co. were again selected to deliver the crisp, clean edges so necessary. O-KNI-CO heat-treating techniques applied give maximum toughness and superb edge holding qualities to these special high quality shear blades.

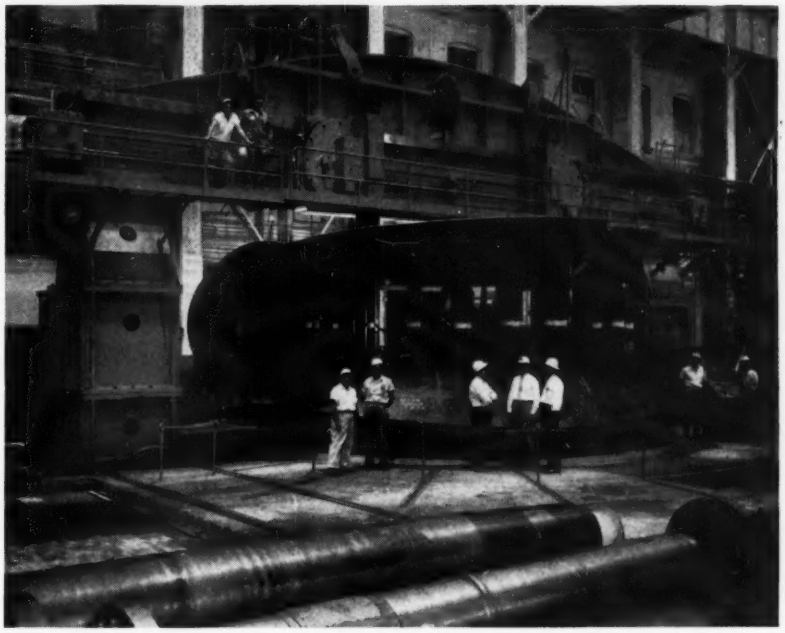


O-KNI-CO special shear blade cutting tough laminated plastic.

Now in Sweets catalog Product Design File

Helpful information on OHIO KNIFE CO. hardened products and their applications.

Tremendous 42 foot boring mill uses O-KNI-CO hardened ways on all wearing surfaces



One of world's largest boring mills equipped with O-KNI-CO processed wear plates.

"Believed to be the largest amount of hardened ways ever used on any machine tool" says Newport News Shipbuilding and Dry Dock Co. The table of this monster weighs 200 tons with an area of 2,375 feet. O-KNI-CO ways, made of "glass hard" ball bearing steel ⅝" thick eternally bonded to a soft, tough core or backing material, were used on all rails and rams. This produces a way that will not warp or bow. Special O-KNI-CO hardening process (65-66 Rockwell C) to the full depth of the tool steel along the entire length of the way, develops fantastic wear resistant qualities. The result is continuing accuracy of the machine under severest work loads.

Two foot wide clad bronze wear plates now being inexpensively produced up to 8 feet in length

The Ohio Knife Co., Cincinnati, Ohio, by a special new process is inexpensively producing bronze wear plates in unusually large sizes. Bronze of only the required thickness is used, clad to a soft, tough, machinable steel base. This steel backing imparts added strength and rigidity, eliminating any possibility of warping or bowing. The cost of these CLAD bronze wear plates is consequently much lower than old-style solid bronze wear plates.

FREE technical literature available. Check off—mail coupon today.

THE OHIO KNIFE CO., Dept. 72-AF
Cincinnati 23, Ohio

Gentlemen: Please send me free copy of:

- ☐ HARDENED WAYS—Seven Cross Sections in over 60 sizes.
- ☐ SHEAR BLADES.
- ☐ SLITTING—A Basic Guide for the New Operator.

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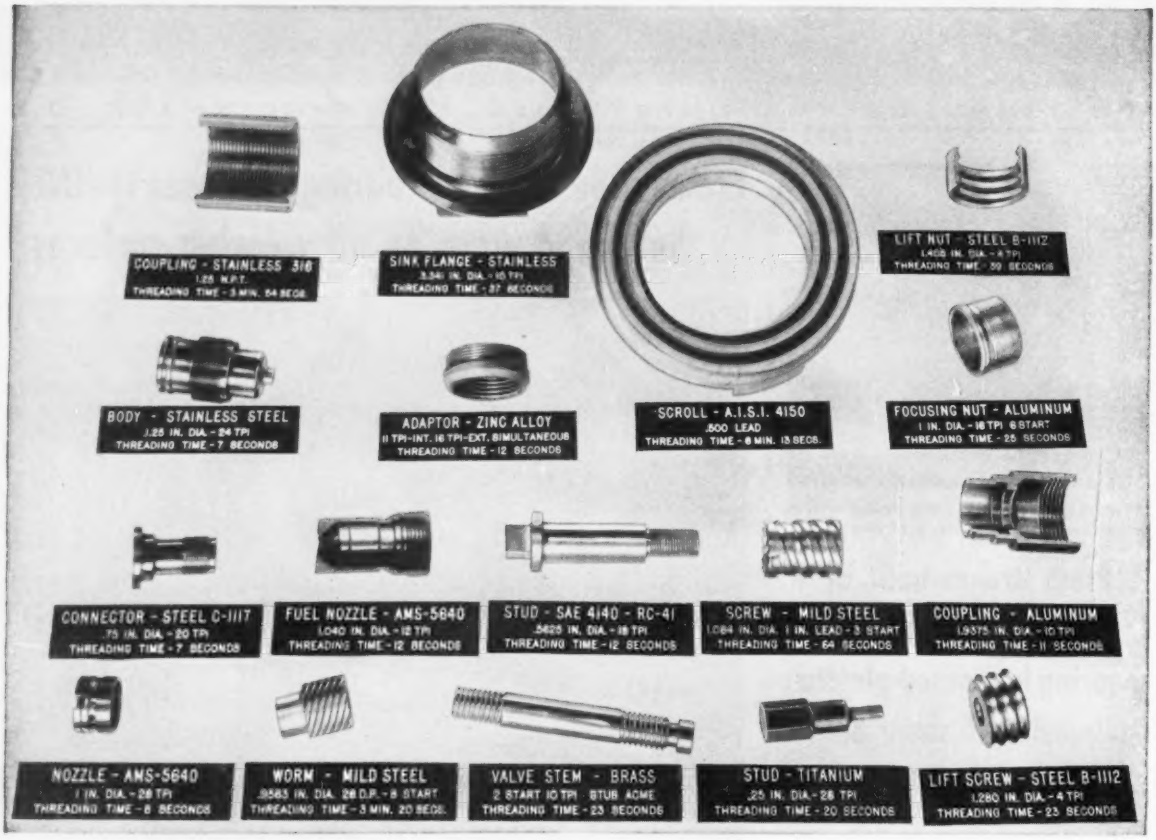
Start saving money right now on threading jobs like these with...


COUPLING - STAINLESS 316
1.25 N.P.T.
THREADING TIME - 3 MIN. 54 SECS.
SINK FLANGE - STAINLESS
3.340 IN. DIA. - 10 TPI
THREADING TIME - 37 SECONDS
LIFT NUT - STEEL B-1112
1.408 IN. DIA. - 4 TPI
THREADING TIME - 39 SECONDS
BODY - STAINLESS STEEL
1.25 IN. DIA. - 24 TPI
THREADING TIME - 7 SECONDS
ADAPTOR - ZINC ALLOY
11 TPI-INT. 16 TPI-EXT. SIMULTANEOUS
THREADING TIME - 12 SECONDS
SCROLL - A.I.S.I. 4150
.500 LEAD
THREADING TIME - 8 MIN. 13 SECS.
FOCUSING NUT - ALUMINUM
1 IN. DIA. - 16 TPI 6 START
THREADING TIME - 25 SECONDS
CONNECTOR - STEEL C-1117
.75 IN. DIA. - 20 TPI
THREADING TIME - 7 SECONDS
FUEL NOZZLE - AMS-5640
1.040 IN. DIA. - 12 TPI
THREADING TIME - 12 SECONDS
STUD - SAE 4140 - RC-41
.5625 IN. DIA. - 18 TPI
THREADING TIME - 12 SECONDS
SCREW - MILD STEEL
1.084 IN. DIA. 1 IN. LEAD - 3 START
THREADING TIME - 64 SECONDS
COUPLING - ALUMINUM
1.9375 IN. DIA. - 10 TPI
THREADING TIME - 11 SECONDS
NOZZLE - AMS-5640
1 IN. DIA. - 28 TPI
THREADING TIME - 8 SECONDS
WORM - MILD STEEL
.9583 IN. DIA. 28 D.P. - 8 START
THREADING TIME - 3 MIN. 20 SECS.
VALVE STEM - BRASS
2 START 10 TPI STUB ACME
THREADING TIME - 23 SECONDS
STUD - TITANIUM
.25 IN. DIA. - 28 TPI
THREADING TIME - 20 SECONDS
LIFT SCREW - STEEL B-1112
1.280 IN. DIA. - 4 TPI
THREADING TIME - 23 SECONDS

CRI-DAN SINGLE-POINT THREADING LATHES

...cut costs with simple single-point carbide tools. They're easily resharpened or replaced. They eliminate expensive upkeep of thread milling cutters or thread grinding wheels.

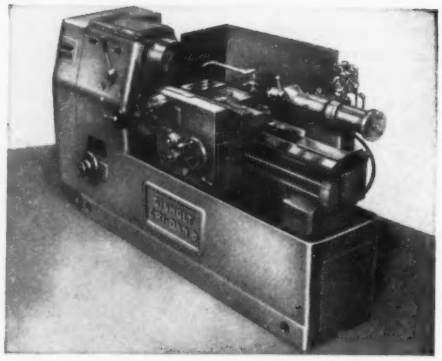
...assure extremely accurate lead and thread form and exceptional finish with low-cost carbide tools on materials that don't allow economical threading by other methods.

...handle any material from titanium or toughest alloy steels to brass and other non-ferrous metals with a wide selection of spindle speeds and feeds to meet all job requirements.

...set up fast to produce single- or multiple-start, coarse or fine, left- or right-hand threads, parallel or tapered with metric or inch pitches—thread up to shoulders on all types of internal and external operations.

...cut costs from start to finish with CRI-DAN's speed, versatility and economy.

Why put off the savings the CRI-DAN method can bring you *right now*? Ask your Gisholt Representative for complete details. Or write us for literature or cost estimates on your particular work.



Two models are available. The smaller Model B (shown) offers extreme flexibility with spindle speeds of from 154 to 2808 r.p.m.; 3' capacity between centers and 15½" swing over bed. Rugged saddle supports fast-acting threading slide, easily positioned along bed. Complete change-over from job to job can be made in 15 minutes.

Investigate Gisholt's Extended Payment and Leasing Plans

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • *Factory-Rebuilt Machines with New-Machine Guarantee*

Scrap Declines in Softer Market

STEEL's index on heavy melting steel drops another $1.33 a ton to $43.50. Sluggish demand and possible resumption of strike in January inject a note of caution

Scrap Prices, Page 162

• **Pittsburgh** — Recent mill purchases at sharply lower prices have rocked the market. One consumer bought substantial tonnages of No. 2 heavy melting and No. 2 bundles, paying $37 and $33 a ton. (As usual, it offered $1 a ton more to sellers outside the district.) Another mill, always in the market, bought small quantities of No. 1 heavy melting at $42, No. 1 dealer bundles at $44, and No. 2 bundles at $29.

Brokers assert consumers would have to pay more for larger tonnages, but there's a good chance small quantities will soon be available at even lower prices. Many dealers are of a mind to get what they can and run for cover. They figure the mills won't buy much in the next few weeks for two reasons: 1. They'll want to be in a good cash position at yearend. 2. They won't want to commit themselves on scrap until the strike threat is removed.

• **Philadelphia**—The market has leveled off, with prices generally unchanged. It reflects an easing in export demand, notably from Japan, with some indications that purchases by that country may be less in the first quarter than in the current three month period. Also, domestic mills are buying cautiously.

• **Chicago**—Weakness is developing in the market despite the rapid rise in steelmaking operations. Major mills are out of the market because of good sized inventories, upsetting hopes of dealers and brokers for a lively poststrike demand. It is reported that No. 2 heavy melting steel has been offered (and declined) at $37 a ton—$2 to $3 below current quotations. Generally, prices are unchanged in the absence of a real buying test.

• **Cleveland**—Scrap is moving on contracts placed during the strike, but there's not much new buying. Not much change is anticipated until the steel labor outlook is clarified.

• **Detroit**—The market is softer as dealers run scared on talk of a possible resumption of the strike in January and suggested government stockpiling of defense needs. Scattered buys of No. 1 bundles and turnings show prices are off $2 to $3 a ton, although brokers' prices appear to be a bit higher.

• **Buffalo**—The market is steady, following placement of new mill orders which resulted in a sharp jump in prices a week ago. It was the first change in the mill scrap price structure since before the strike.

No. 1 heavy melting is quoted $39-$40 although no large orders in that grade have been reported.

• **Cincinnati**—The market appears to be drifting, with mill buying still absent. Prices on the steelmaking grades are firm, with No. 1 heavy melting quoted by brokers at $38-$39.

• **St. Louis**—Prices are unchanged. Any advance that had been expected seems out of the question until the steel labor dispute is disposed of.

• **Birmingham**—While the No. 2 grades and specialties are moving, not much buying is being done by open hearth and electric furnace plants. The Atlanta mill raised its prices $1 a ton above its last purchase, but brokers say the market is easier with dealers anxious to move material at present price levels.

• **Houston**—New Mexican demand has enlivened the south Texas market. Limited purchases have also been made by the Lone Star mill, and there has been continued buying for export.

The Monterrey (Mexico) mill increased its buying prices $1.50 a ton for the No. 1 and No. 2 grades of heavy melting. Broker quotations based on the Mexican order are pegged at $48 for No. 1 steel and $45 for No. 2.

• **San Francisco**—Prices are holding at the recently established levels. Exporters to Japan are competing actively for available material, and local market strength reflects rising prices in Los Angeles.

• **Seattle**—Reopening of the steel mills has not resulted in heavy demand for scrap. Mill inventories are substantial.

Scrap Freight Ruling Upheld by Commission

The Institute of Scrap Iron & Steel Inc., Washington, last week

(*Please turn to Page* 167)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Nov. 25, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 25	$43.50
Nov. 18	44.83
Oct. Avg.	44.00
Nov. 1958	41.42
Nov. 1954	33.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 dealer bundles	*43.00-44.00*
No. 2 bundles	*32.00-33.00*
No. 1 busheling	*41.00-42.00*
No. 1 factory bundles	55.00-56.00
Machine shop turnings	24.00-25.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings	*30.00-31.00*
Cast iron borings	*30.00-31.00*
Cut structurals:	
2 ft and under	51.00-52.00
3 ft and under	50.00-51.00
Heavy turnings	38.00-39.00
Punchings & plate scrap	56.00-57.00
Electric furnace bundles	54.00-55.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	47.00-48.00
Drop broken machinery	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt.	51.00-52.00
Rails, 2 ft and under	67.00-68.00
Rails, 18 in. and under	68.00-69.00
Random rails	61.00-62.00
Angles, splice bars	61.00-62.00
Railroad specialties	61.00-62.00
Rails, rerolling	66.00-67.00

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	115.00-120.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	45.00-46.00
No. 1 hvy melt., dealer	42.00-43.00
No. 2 hvy melting	39.00-40.00
No. 1 factory bundles	49.00-50.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	29.00-30.00
No. 1 busheling, indus.	45.00-46.00
No. 1 busheling, dealer	42.00-43.00
Machine shop turnings	25.00-26.00
Mixed borings, turnings	27.00-28.00
Short shovel turnings	27.00-28.00
Cast iron borings	27.00-28.00
Cut structurals, 3 ft	52.00-53.00
Punchings & plate scrap	54.00-55.00

Cast Iron Grades

No. 1 cupola	57.00-58.00
Stove plate	52.00-53.00
Unstripped motor blocks	49.00-50.00
Clean auto cast	64.00-65.00
Drop broken machinery	64.00-65.00

Railroad Scrap

No. 1 R.R. heavy melt	47.00-48.00
R.R. malleable	65.00-66.00
Rails, 2 ft and under	64.00-65.00
Rails, 18 in. and under	65.00-66.00
Angles, splice bars	57.00-58.00
Axles	61.00-62.00
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles, solids	215.00-220.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	36.00-37.00
No. 1 busheling	*48.00-49.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	29.00-30.00
Machine shop turnings	18.00-19.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	*49.00-50.00*
Electric furnace bundles	*49.00-50.00*

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00

CLEVELAND

No. 1 heavy melting	*40.00-41.00*
No. 2 heavy melting	33.00-34.00
No. 1 factory bundles	46.00-47.00
No. 1 bundles	*42.00-43.00*
No. 2 bundles	26.00-27.00
No. 1 busheling	*45.00-46.00*
Machine shop turnings	16.00-17.00
Short shovel turnings	22.00-23.00
Mixed borings, turnings	22.00-23.00
Cast iron borings	22.00-23.00
Cut foundry steel	45.00-46.00
Cut structurals, plate 2 ft and under	*49.00-50.00*
Low phos. punchings & plate	*45.00-46.00*
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	*46.00-47.00*

Cast Iron Grades

No. 1 cupola	55.00-56.00
Charging box cast	43.00-44.00
Heavy breakable cast	41.00-42.00
Stove plate	49.00-50.00
Unstripped motor blocks	39.00-40.00
Brake shoes	39.00-40.00
Clean auto cast	58.00-59.00
Burnt cast	47.00-48.00
Drop broken machinery	58.00-59.00

Railroad Scrap

R.R. malleable	68.00-69.00
Rails, 2 ft and under	67.00-68.00
Rails, 18 in. and under	68.00-69.00
Rails, random lengths	61.00-62.00
Cast steel	53.00-54.00
No. 1 railroad cast	58.50-59.50
Railroad specialties	59.00-60.00
Angles, splice bars	59.00-60.00
Rails, rerolling	74.00-75.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	125.00-130.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	37.00-40.00
No. 2 heavy melting	35.00-38.00
No. 1 bundles	46.50
No. 2 bundles	26.00
No. 1 busheling	46.50
Machine shop turnings	20.00
Short shovel turnings	20.00

Cast Iron Grades

No. 1 cupola	55.00
Charging box cast	46.00
Heavy breakable cast	44.00
Unstripped motor blocks	45.00
Clean auto cast	56.00
Stove plate	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.00
Rails, 18 in. and under	56.00
Rails, random lengths	51.00
Rails, rerolling	65.00
Angles, splice bars	50.00

BIRMINGHAM

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	37.00-38.00
No. 2 bundles	25.00-26.00
No. 1 busheling	42.00-43.00
Cast iron borings	14.00-15.00
Machine shop turnings	25.00-26.00
Short shovel turnings	28.00-29.00
Bar crops and plate	47.00-48.00
Structurals & plates	46.00-47.00
Electric furnace bundles	42.00-43.00
Electric furnace:	
3 ft and under	41.00-42.00
2 ft and under	40.00-41.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Stove plate	55.00-56.00
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00-43.00
Rails, 18 in. and under	56.00-57.00
Rails, rerolling	61.00-62.00
Rails, random lengths	53.00-54.00
Angles, splice bars	*50.00-51.00*

PHILADELPHIA

No. 1 heavy melting	45.00
No. 2 heavy melting	40.00
No. 1 bundles	*48.00*
No. 2 bundles	*29.00-30.00*
No. 1 busheling	49.00
Electric furnace bundles	50.00
Mixed borings, turnings	21.00-22.00†
Short shovel turnings	27.00
Machine shop turnings	24.00
Heavy turnings	35.00†
Structurals & plates	51.00-53.00
Couplers, springs, wheels	51.00
Rail crops, 2 ft & under	66.00-68.00

Cast Iron Grdes

No. 1 cupola	46.00-47.00
Heavy breakable cast	48.00
Drop broken machinery	55.00
Malleable	68.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	38.00-39.00
No. 2 bundles	22.00-23.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	15.00-16.00
Low phos. structurals & plates	39.00-40.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	*37.00-38.00*

Stainless Steel

18-8 sheets, clips, solids	200.00-205.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	39.00-40.00
No. 2 bundles	28.00-29.00
No. 1 busheling	39.00-40.00
Short shovel turnings	24.00-25.00
Machine shop turnings	20.00-21.00
Cast iron borings	22.00-23.00
Low phos structurals and plate, 2 ft and under	47.00-48.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	51.00-52.00

Railroad Scrap

Rails, random lengths	49.00-50.00
Rails, 3 ft and under	55.00-56.00
Railroad specialties	47.00-48.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	38.00-39.00
No. 2 bundles	28.00-29.00
No. 1 busheling	38.00-39.00
Machine shop turnings	21.00-22.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	24.00-25.00
Cast iron borings	23.00-24.00
Low phos. 18 in.	49.00-50.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Heavy breakable cast	44.00-45.00
Charging box cast	44.00-45.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
Rails, 18 in. and under	63.00-64.00
Rails, random lengths	55.00-56.00

HOUSTON

(Exporters' buying prices; f.a.s.)

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	37.00-38.00
No. 2 bundles	26.50-27.50

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00†
No. 2 heavy melting	31.00†
No. 1 bundles	34.00
No. 2 bundles	20.00†
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	48.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Heavy breakable	35.00
Foundry malleable	43.00-44.00
Unstripped motor blocks	38.50-39.50

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	25.50-26.50
No. 1 bundles	37.00-38.00
No. 1 busheling	37.00-38.00
Machine shop turnings	13.00-14.00
Short shovel turnings	15.00-16.00
No. 1 cast	39.00-40.00
Mixed cupola cast	38.00-39.00
No. 1 machinery cast	40.00-43.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	*26.00-27.00*
No. 1 bundles	*41.00-42.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*38.00-39.00*
Machine shop turnings	*15.00-16.00*
Mixed borings, turnings	*16.00-17.00*
Short shovel turnings	*17.00-18.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	40.00-41.00
Heavy breakable	40.00-41.00
Unstripped motor blocks	32.00-33.00
Charging box cast	40.00-41.00
Clean auto cast	53.00-54.00

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	32.00-33.00
No. 1 bundles	25.00
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

(Brokers' buying prices)

No. 1 heavy melting	40.00
No. 2 heavy melting	38.00
No. 1 bundles	39.00
No. 2 bundles	22.00
Machine shop turnings	18.00
Shovel turnings	20.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	40.00
No. 2 heavy melting	36.00
No. 1 bundles	36.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	44.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory:	
Prepared	32.25
Unprepared	26.25
Short steel turnings	17.00

Cast Iron Gradest

No. 1 machinery cast	46.50-48.00

*Delivered to docks.
†Nominal.
‡F.o.b. Hamilton, Ont.

Luria Brothers and Company, Inc.

main office **CHRYSLER BUILDING EAST,** *New York, N. Y.*

PLANTS

READING, PENNA. MODENA, PENNA.

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IMPORT & EXPORT
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Kennecott Signs with USW

Largest domestic producer grants 22.3 cents an hour over 20 month period to end three and one half month copper strike. Neither side victor. Other producers still holding out

Nonferrous Metal Prices, Pages 166 & 167

WITH THE deadlock in the three and a half month old copper strike broken by a new contract signed between Kennecott Copper Corp. and the United Steelworkers of America, metalmen are asking this question: What did the strike accomplish?

• **Terms**—First, take a look at the new package.

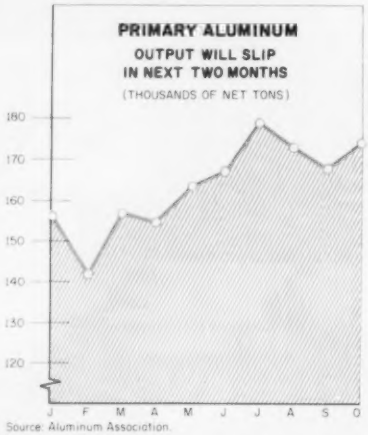
It calls for an increase of 22.3 cents an hour over a 20 month period. Breakdown: Between now and July 31 workers will receive 8.7 cents in wages, 3.3 cents in fringes. In the following 12 months, they'll get an additional 8.7 cents in wages, 1.6 cents in fringes.

Company gains sound pretty small in comparison. Kennecott reportedly doesn't have to make the settlement retroactive to the beginning of the strike. The company is believed to have won a "no work stoppage" clause and union recognition of the company's right to organize overtime work. There may have been some progress on rules and regulations.

• **Hollow Victory**—If there was a winner in the long dispute, it was the union. Certainly, the final settlement was higher than copper management had originally indicated it would go (but considerably under what the union first asked). And it's hardly likely the small concessions the union made in noneconomic areas could be called a major victory for management.

Conversely, while the union may have a dubious victory, the copper worker has little to crow about. If the union had accepted the original 17.9 cent offer from Kennecott back in August, he wouldn't be out a conservative $1500 in wages. It will take him about 694 weeks or 13.3 years under the new settlement to recoup what he lost when his union turned down the original offer. That's hardly progress!

• **Mine-Mill Next**—As STEEL went to press, Kennecott representatives were ready to make the same offer to the International Union of Mine, Mill & Smelter Workers. There was every indication that the union would jump at the chance to settle.



Source: Aluminum Association

It usually follows the lead of the USW (though sometimes reluctantly), and its membership has been pretty vocal about wanting to get back to work.

• **How Soon? How Much?**—Before the ink was dry, Kennecott had begun recalling workers at its Utah refinery, but at STEEL's press time Mine-Mill union pickets were blocking back-to-work movements at the Hayden, Ariz., smelter. Some refined output will probably be on its way to customers by Dec. 1 since the company had a two to three week supply of concentrates when the strike commenced.

• **Jackpot Question** — Of primary importance now is how the Kennecott settlement will affect the other domestic producers. Other companies have been insisting all along that their costs are higher than Kennecott's and that they can't be so generous.

Remember, some have lead and zinc operations in conjunction with copper, which complicate what they say they can grant. But the union keeps insisting there will be "no discount for poor relations," says an industry negotiator. It's probable the other producers will try hard not to go along with the Kennecott settlement, but some candidly admit they don't know if they'll be successful.

• **Feet Dragging in Aluminum**—While the copper kettle boils, aluminum continues to operate under low pressure. Neither side appears eager to settle, and there is no negotiation at any level. Reports that the companies are forming a solid front for negotiations seem without substance. Aluminum people say: There will be no co-ordinated strategy. Each company will keep the others informed of any progress but will bargain individually.

NONFERROUS PRICE RECORD

	Nov. 24 Price	Last Change	Previous Price	Oct. Avg	Sept. Avg	Nov., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	24.700
Copper	33.00	Nov. 12, 1959	31.50	31.278	31.500	29.415
Lead	12.80	Aug. 24, 1959	11.80	12.800	12.800	12.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	100.25	Nov. 23, 1959	100.625	31.278	31.500	29.415
Zinc	12.50	Nov. 2, 1959	12.50-13.00	12.259	11.360	11.386

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

PRECISION® Quarterly NUMBER 3

PRECISION WELDER AND FLEXOPRESS CORPORATION, 3520 Ibsen, Cincinnati 9, Ohio

"Unweldable" Alloys Welded

Electrical contacts that won't hold to themselves are welded easily in manufacturing.

MILWAUKEE, WISC. – Engineers at Cutler-Hammer, Inc., have found a way to eat their cake and have it too.

Many of the switches and the circuit breakers which Cutler-Hammer manufactures employ contact pieces made of silver-cadmium-oxide. Such contacts won't stick, burn or weld together when a switch arcs. But the strongest way to fasten a contact to an operating lever is to weld it, so this same quality of "unweldability" creates a critical production problem.

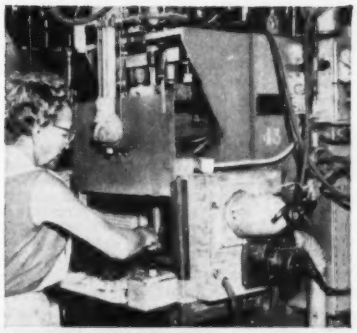
Instead of searching for substitute methods, Cutler-Hammer meets the problem head on – it welds the "unweldable". Six Magna Flash welders made by Precision Welder and Flexopress Corp. are doing this important job at Cutler-Hammer.

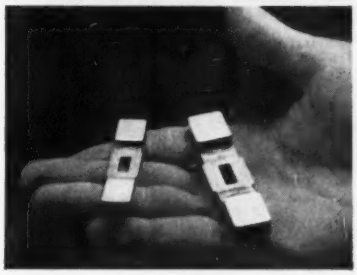
Only Magna Flash fuses the entire mating surface between contact piece and the part to which it is welded. The weld is made "in a flash." Moving switch parts welded by Magna Flash can be made lighter and more accurate because they aren't annealed or distorted by the quick heat. The low inertia of light parts means Cutler-Hammer can make faster-acting switches.

For bread and butter welding of silver to copper alloys and stainless to stainless, Cutler-Hammer has a line of 35 Precision Magnetic Force welders. They produce millions upon millions of faultless welds each year, with the highest reliability in the industry. The same current which makes the weld energizes an electromagnet which forges the weld joint at the exact instant of peak heat.

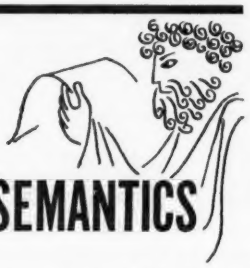
Magna Flash is the refinement of Magnetic Force welding which makes full area welds possible on most materials formerly considered unweldable. With Magna Flash, the low voltage welding current is concentrated on a small nib protruding from the workpiece. This nib vaporizes, ionizing the air gap and triggering the welding arc. Then as the weld surface becomes molten, a magnet instantaneously energizes to produce the precisely timed forging blow.

It's a neat trick, and when your circuit breakers and switches give you extra years of life, there's probably Precision welding behind them.





ON PRESSEMANTICS



THE GREEKS, we are told, differentiated between seven varieties of love, and had a name for each. A similar situation seems to be occurring with presses.

Nobody ever calls a Flexopress a "punch press" any more. They say, "We're running the job on the *Flexopress,*" (usually with a wide grin of satisfaction). When they have two Flexopresses the grin is even wider.

This is as it should be: The clumping, garden variety of punch presses relegated to one corner of the vocabulary, and the precise, quiet, rapid Flexopresses set off in their own private bailiwick.

We can see it coming now, the inevitable dictionary definition:

> **FLEX'O·PRESS:** Proprietary name for line of high-speed, C-type and straight side, automatic, precision presses manufactured *by Precision Welder and Flexopress Corporation,* Cincinnati, Ohio. Not to be confused with ordinary punch presses. See *precision, automation, ball-bearing slides, dependability.*

I'd like to have . . . PRECISION

- ☐ Bulletin MF-101 on Magnetic Force Welders for superior welding of electrical contacts and critical materials.
- ☐ Bulletin G-100, describing the full line of Precision Resistance Welders.
- ☐ Bulletin AFP-101, describing Precision C-type and straight side Flexopresses.
- ☐ A call from a competent Precision engineer to discuss ways to improve production with ☐ Precision Welders ☐ Flexopresses.

PRECISION WELDER and FLEXOPRESS CORPORATION, 3520 Ibsen Ave., Cincinnati 9, Ohio

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.40 per lb deld.

Cobalt: 99+ %, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, nom.; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, less than 1 kg, $8.30 per gram; 1-10 kg, 33.30 per gram; 10 kg or more, 31.30 per gram; intrinsic grade, 33.30-35.30 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $215-217 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $3.15-11.50 per lb, depending on quantity; 5000 lb or more, $3 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $22-24 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $2.50 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 100.25.

Titanium: Sponge, 99.3+ % grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+ % hydrogen reduced, $3.00-3.80.

Zinc: Prime western, 12.50; brass special, 12.75; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 13.75; special high grade, 14.00 deld. Diecasting alloy ingot No. 3, 15.75; No. 2, 16.25; No. 5, 16.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7.00 per lb; over 500 lb, $6.50 per lb.
(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-27.75; No. 12 foundry alloy (No. 2 grade), 23.75-24.00; 5% silicon alloy, 0.60 Cu max., 25.50; 13 alloy, 0.60 Cu max., 25.00; 195 alloy, 26.75-27.00; 108 alloy, 24.25-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50; grade 2, 23.25; grade 3, 22.25; grade 4, 21.50.

Brass Ingot: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.50; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.25; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 29.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.925, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.905, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lot, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003, and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.065	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	46.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.85
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	69.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.530	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length diam., 0.375-8 in., "F" temper; 2014 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¾ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheets and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-75.30	90.60-91.30
36-38	66.10-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.75-25.25; No. 2 heavy copper and wire, 21.75-22.25; light copper, 20.25-20.75; No. 1 composition red brass, 18.50-18.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 33.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.12b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	20.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.25-17.75; new brass clippings, 16.00-16.50; light brass, 12.25-12.50; heavy yellow brass, 13.25-13.75; new brass rod ends, 14.00-14.50; auto radiators, unsweated, 14.50-15.00; cocks and faucets, 15.50-16.00; brass pipe, 15.75-16.20.

Lead: Soft scrap lead, 8.50-9.00; battery plates, 4.25-4.50; linotype and stereotype, 10.00-10.50; electrotype, 8.25-8.75; mixed babbitt, 9.25-9.75.

Monel: Clippings, 30.00-32.00; old sheets 26.00-28.00; turnings, 20.00-22.00; rods, 30.00-32.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 4.25-4.75; new diecast scrap, 4.00-4.25; old diecast scrap, 2.50-2.75.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.25-12.75; clean borings and turnings, 9.50-10.00; segregated low copper clips, 16.25-16.75; segregated high copper clips, 15.50-16.00; mixed low copper clips, 15.50-16.00; mixed high copper clips, 15.00-15.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, nom.; No. 2 heavy copper and wire 25.50; light copper, 23.50; refinery brass (60% copper) dry copper content, 24.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, nom.; No. 2 heavy copper and wire, 25.50; light copper, 23.50; No. 1 composition borings, 22.25; No. 1 composition solids, 23.00; heavy yellow brass solids, 16.75; yellow brass turnings, 15.50; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.40.

Copper: Flat-rolled, 50.04; oval, 48.00; 5000-10,000 lb; electrodeposited, 42.50, 2000-5000 lb lots; cast, 45.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 119.50; 200-499 lb, 118.00; 500-999 lb, 117.50; 1000 lb or more, 117.00.

Zinc: Balls, 19.75; flat tops, 19.75; flats, 22.50; ovals, 21.75, ton lots.

CHEMICALS

Cadmium Oxide: $1.40 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.10; 100-600 lb, 69.70; 700-1900 lb, 67.00; 2000-9900 lb, 65.10; 10,000 lb or more, 63.80.

Stannous Chloride (Anhydrous): 25 lb, 154.40; 100 lb, 149.50; 400 lb, 147.10; 800-19,900 lb, 106.20; 20,000 lb or more, 100.10.

Stannous Sulphate: Less than 50 lb, 139.60; 50 lb, 109.60; 100-1900 lb, 107.60; 2000 lb or more, 105.60.

Zince Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 161*)

reported an Interstate Commerce ruling in favor of the scrap industry. It involved a petition of eastern railroads to knock out the 3 per cent (maximum, 40 cents) compromise rate increase, which was put into effect in 1958 after a long struggle by the scrapmen.

Eastern roads had sought to reimpose the flat 40 cent increase which they originally requested from the ICC, and which had been rejected.

Distributors . . .

Prices, Page 156

Stocks of steel at service centers which had been closed during the strike are being depleted rapidly. Large tonnages were "frozen" after July 14 until the injunction became effective Nov. 7.

Inventories at service centers which remained opened during that period were reduced sharply and probably will not be replenished fully on standard grades and sizes until late in the first quarter of 1960.

If the steelworkers go out again in mid-January, another period of stringent supplies would be faced by fabricators.

Most steel consumers in the Southwest are not concerned about stocks. Substantial supplies of foreign steel held at mill depots in that area still act as a damper on sales by domestic distributors. Speculators in foreign steel may cut prices sharply.

Rails, Cars . . .

Track Material Prices, Page 154

Freight car order backlogs as of Nov. 1 totaled 36,119 cars vs. 35,626 on Oct. 1 and 23,670 on Nov. 1, 1958, reports the American Railway Car Institute and the Association of American Railroads. Of the 36,119 cars on order and undelivered at the start of the month, 17,816 were in railroad shops and 18,383 in commercial shops.

Freight car business continues slow, although October orders were up from September's—2722 cars vs. 945. In October last year orders totaled 666.

October deliveries totaled 2147

FOR SALE

AT ATTRACTIVE PRICES

100 All Steel Twin Hopper Cars
60-ton capacity
Built new 1940

Fully Repaired — Immediate Shipment

Phone — Wire — Write

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DEarborn 2-5422

FOR SALE

Pannier Bar and Tube Printer, Type J. Capacity ¼ to 2½" O.D., 300 feet per minute. Machine is in good operating condition.

SUPERIOR TUBE COMPANY
P. O. Box 119 Wapakoneta, Ohio

WANTED

10,000# 7/16" Hex C.F.
We will order all or part.

Gower Manufacturing Company
P. O. Box 3742 Greenville, S. C.
CE 2-6723

FORGING PRESS WANTED

1000 to 2000 ton hydraulic forging press with steam intensifier.

Please give full description with reply.

General Ore & Chemical Corp.
417 So. Hill Street
Los Angeles 13, California

CLASSIFIED

Help Wanted

COKE OVEN BY-PRODUCT SUPERVISORS Well-established corporation operating coke ovens and by-product plant in Alabama needs technically trained and experienced supervisors capable of qualifying in short time for high-level management positions. College training preferred. Submit full resume. All replies confidential. Reply Box 804, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

ADMINISTRATIVE ASSISTANT—Fifteen years experience in western steel plate fabricating plants. Write Box 807, STEEL, Penton Bldg., Cleveland 13, Ohio.

COMMISSION AGENT available to represent your company in the Pgh and Tri State area. I specialize in sales to industrial distributors and O.E.M. Reply Box 808, STEEL, Penton Bldg., Cleveland 13, Ohio.

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From toys to tractors, painted metal products look better and last longer with Oakite CrysCoat under the paint.

CrysCoating—the conversion of a steel surface to a phosphate surface—creates a perfect base for paint adhesion. Paint goes on in a smooth, serviceable coat. Once on, it stays on.

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Oakite has a CrysCoat process to fit every requirement—for iron phosphate or zinc phosphate coatings, for spray washer or for tanks. Is your particular problem one of economy? Durability? Production bottle-neck? For a helpful answer, ask your local Oakite man. Or write for details to Oakite Products, Inc., 26H Rector Street, New York 6, N. Y.

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OAKITE

50 1909-1959 SCIENCE

years' leadership in industrial cleaning

units vs. 2481 in September and 1658 in October a year ago.

Pig Iron . . .

Pig Iron Prices, Page 156

Pig iron production is rising steadily as mills place additional furnaces in operation. Consumption is increasing in line with the gains registered by steelmaking furnaces. Steel mills are using a high ratio of hot metal in their open hearth melts. They're taking much of the blast furnace output.

Demand for merchant iron is maintaining good levels for this time of year.

Inland Steel Co. is beginning to use substantial tonnages of sinter in its blast furnaces.

Iron Ore . . .

Iron Ore Prices, Page 158

Although 220 out of 241 vessels in the Great Lakes iron ore fleet are in commission, the movement of ore from the head of the lakes has been slowed by adverse weather. Vessel operators say they'll be lucky if they can bring down 10 million gross tons before the lakes freeze halting shipping for the 1959 season.

Though the navigation season has been extended beyond Dec. 15, the usual deadline, vesselmen don't expect to bring down much, if any, ore after that date. They point out that the largest November-December movement of lake ore in history totaled only about 10 million tons, and they doubt that figure can be bettered.

Imports of iron ore in August were 3,181,369 gross tons, bringing the total for the first eight months of the year to 21,078,183 tons. Breakdown of imports by sources follows:

Iron Ore Imports—Eight Months 1959-1958
(Gross tons)

Sources:	1959	1958
Brazil	797,541	500,380
British W. Africa	38,101	29,280
Canada	7,362,185	4,667,669
Chile	2,407,089	2,177,016
Cuba	1,600	.....
Denmark	309	98
Dominican Republic	50,370	21,000
Iran	.....	2,461
Liberia	732,046	514,581
Mexico	77,878	146,138
Panama	.....	13,856
Peru	1,072,944	1,254,950
Philippines	53,998	53,851
Spain	209	.....
Surinam	2,320	.....
Sweden	22,587	93,984
United Kingdom	18,954	544
Venezuela	8,440,052	8,065,674
Totals	21,078,183	17,541,482

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Coming in December Issues of STEEL

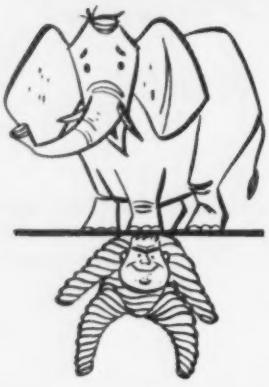
Foreign Roundups

What's the business outlook overseas? How will the developments in 1960 affect U.S. metalworking? STEEL will explore these and related questions in its next four issues.

Editors will report on South American prospects Dec. 7. Western Europe will be examined Dec. 14; Russia and the European satellites will be studied Dec. 21; and Asia will be under scrutiny Dec. 28.

Tuffy Tips —on safe use of Slings and Hoist Lines

How Much Lifting Should be Done by Muscles?



Individual differences between workers make this a hard question to answer categorically. For a rule of thumb: the United States Department of Labor recommends men should handle no more than 50 pounds; women no more than 25 pounds. Of course, this is for men and women of average size and weight, in normally good physical condition. To remove all doubt, mechanical lifting and hoisting equipment should be used for all loads not comfortably lifted by muscles.

Rules to Remember For Wire Rope Safety

1. **BREAK IN** new wire rope with care. Don't use it at maximum load capacity until it is broken in beyond a doubt.
2. **OBSERVE SAFETY FACTORS.** Usually the rated load factor is 4 to 5. The Wire Rope Technical Board says 5. Elevators require 10. Static ropes — not hoisting, dragging or actively operating —may have a rated load factor of 3.
3. **LUBRICATION IS IMPORTANT** for safety, as well as for pliability and friction-fighting. Rust makes ropes brittle, and likely to break without warning. Thorough lubrication keeps out rust.
4. **INSPECT ROPES** and slings frequently for signs of serious wear. Careful inspection may save costly work stoppage or serious injury.

Sling Fittings Are Important Safety Aids

Proper fittings serve the dual purpose of greater safety and longer sling life. Fittings used on Tuffy Slings are made in more than a score of types, for every kind of service. Two of them are shown here:

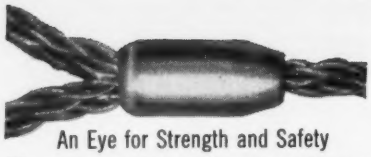
(1) **EYE HOOKS:** Fittings for Tuffy Slings are selected on the basis of providing the complete unit assembly with equal breaking strength overall. Eye hooks are forged steel, weldless and designed for efficiency.

(2) **NEWCO SAFETY HOOK:** People can forget to lock a hook gate. This safety hook always remembers. A load cannot be lifted without the gate (yoke) automatically locking. To be opened, it must be manually pressed against a compression spring. We also supply this safety hook with a swivel eye for the sling. The name: Newco Safety Swivel Hook.

Tuffy Hoist Line: Stalwart Companion of Tuffy Slings

Tuffy Slings and Hoist Lines work as an efficient team on all types of overhead cranes, derricks and clamshells. Like all Tuffy Special Purpose Wire Ropes, Tuffy Hoist Line has the right combination of strength, flexibility and toughness for greatest safety and longest service life. Use this Tuffy "team" to cut hoisting costs in every type of materials handling.

Your Tuffy Distributor Offers the Most in Service and Savings



An Eye for Strength and Safety

Slipped over the tuck-splice of the sling eye, and pressed on under tremendous hydraulic pressure, the steel ferrule holds so tight that it gives the eye splice full strength of the fabric. What's more, it is smoothly tapered to meet the main body of the sling. No abrupt edges or rough projections to injure hands and slow down work. The extra life, efficiency and safety of Tuffy's pressed-on ferrule is yours at no extra cost.

Tuffy Leads with Two Lives

"Tuffy Slings give us double the service life of ordinary slings." So reported one of the big steel corporations. The secret of Tuffy's extra life: the patented 9-part machine-braided fabric. It provides a combination of flexibility and strength never possible with ordinary wire rope.

Tuffy Takes the Danger Out of Kinks

In the first place, Tuffy Slings are not likely to kink at all. Try to kink a Tuffy. Even if you succeed with the aid of a vise, the kink can be easily straightened out with no material damage. Tuffy's machine-braided fabric won't take a "set" or deformity under the toughest of ordinary working conditions. So the danger of rope-weakening kinks is eliminated.

FREE! New Tuffy Sling Handbook

Revised and enlarged edition of famous sling manual. Covers all the bases in selection and use of Tuffy Slings and sling fittings. Gives types, dimensions, weights and rated loads. Even includes safety-approved standard signals used in operation of various equipment. Send for your free copy now. Write **Union Wire Rope Corporation, 2160 Manchester Ave., Kansas City 26, Mo.**

. . . Specialists in high-carbon wire, wire rope, braided wire fabric and stress relieved wire and strand.

UNION Wire Rope

S1

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This is still another example of Ohio Rubber leadership and experience in "Customeering"* components for outstanding manufacturers of original equipment in *every* industry. For more information on this and other ORCO services write direct to The Ohio Rubber Company, Willoughby, Ohio. 9PA3

*Trade mark of The Ohio Rubber Company

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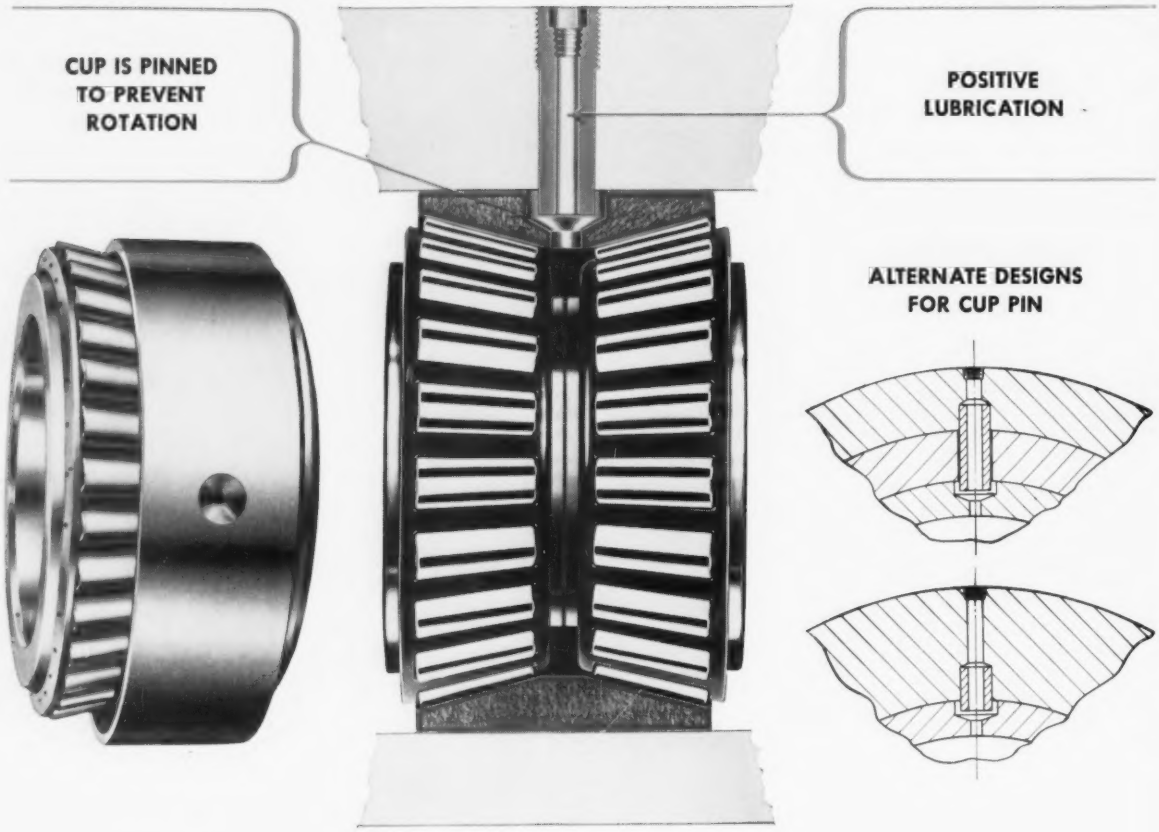

NOW! A double-row bearing for any floating position

REDUCES WEAR AND POUNDING
PROVIDES FOR POSITIVE LUBRICATION

Now you can get a new Timken® bearing—first of its kind developed for floating bearing positions—that answers the problem of excessive wear from creeping and pounding in gear drives, spindles and many other applications. It's a pin-cup, double-row tapered roller bearing. Manufacturers can assemble and adjust gear drives, then merely set the pin. Result is a bearing that floats endwise but cannot turn in the housing. It greatly reduces wear, provides for continuous, positive lubrication. This new Timken bearing gives you all these advantages for those applications where there is an inherent tendency for the cup to creep or turn in the housing.

1) *Positive lubrication* because oil is fed continuously through the pin. 2) *Longer bearing life* because bearing creep is eliminated. Related parts are better protected, too.

This new pin-cup bearing results from Timken bearing research and development. Research to make machines perform better at lower cost. And the combined, new $2½ million engineering and research facilities of the Timken Company, unique in the industry, make progress like this possible. Make it yours when you use Timken bearings in the machines you build or buy. Another reason why "Timken" is your No.1 bearing value. ***When you buy Timken® bearings you get...*** *1) Quality you can take for granted. 2) Service you can't get anywhere else. 3) The best-known name in bearings. 4) The pace setter in lower bearing costs.* The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

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